

THE SUPPLEMENT
TO THE
UNITED STATES NAVAL MEDICAL BULLETIN

PUBLISHED FOR THE INFORMATION OF

THE HOSPITAL CORPS
OF THE NAVY

ISSUED BY

THE BUREAU OF MEDICINE AND SURGERY
NAVY DEPARTMENT
DIVISION OF PUBLICATIONS
CAPTAIN J. S. TAYLOR, MEDICAL CORPS, UNITED STATES NAVY
IN CHARGE

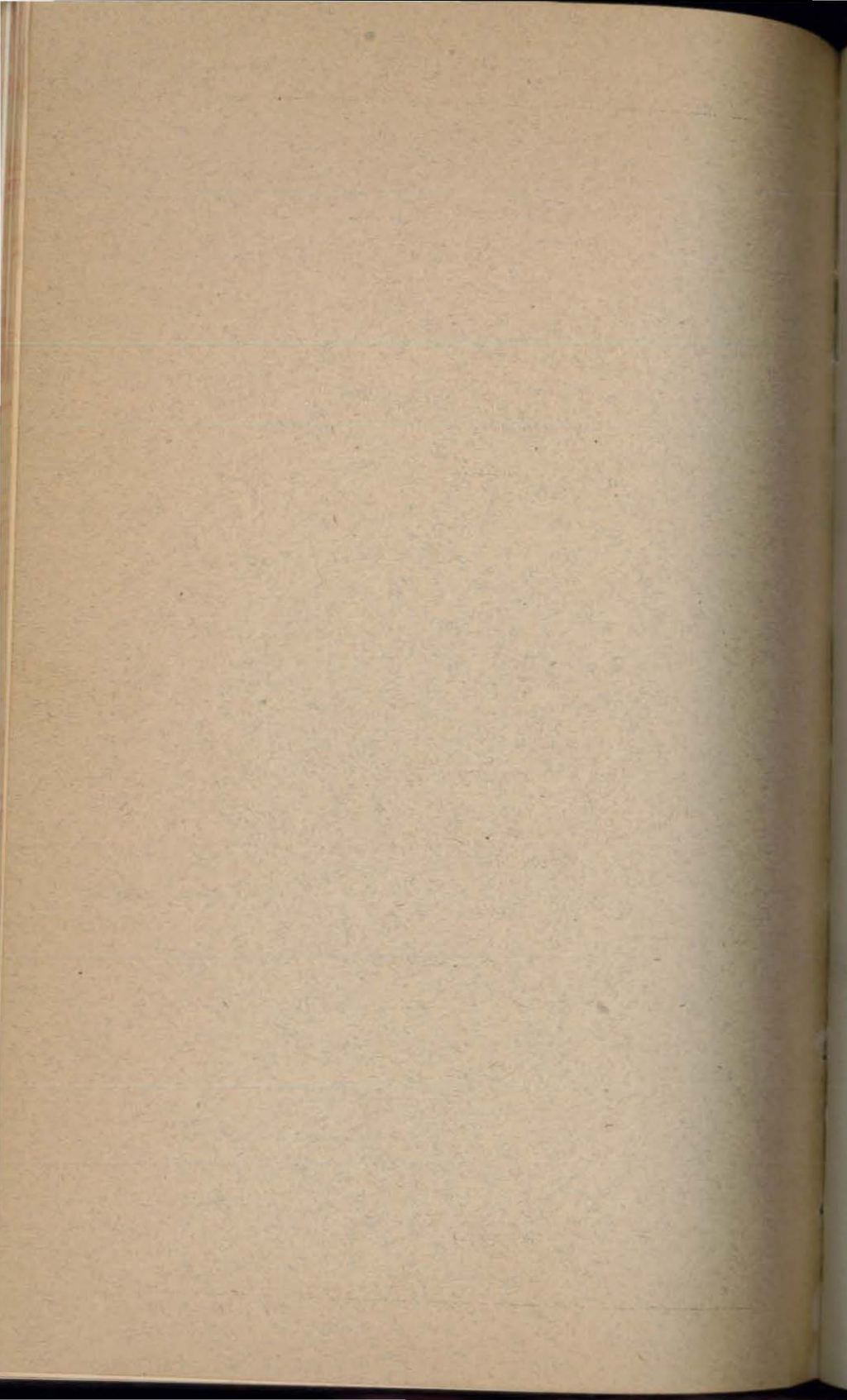
EDITED BY

LIEUTENANT COMMANDER H. H. LANE, MEDICAL CORPS
UNITED STATES NAVY

OCTOBER, 1919
(NUMBER 11)



WASHINGTON
GOVERNMENT PRINTING OFFICE
1919



THE SUPPLEMENT
TO THE
UNITED STATES NAVAL MEDICAL BULLETIN
PUBLISHED FOR THE INFORMATION OF
THE HOSPITAL CORPS
OF THE NAVY

ISSUED BY
THE BUREAU OF MEDICINE AND SURGERY
NAVY DEPARTMENT
DIVISION OF PUBLICATIONS
CAPTAIN J. S. TAYLOR, MEDICAL CORPS, UNITED STATES NAVY
IN CHARGE

EDITED BY
LIEUTENANT COMMANDER H. H. LANE, MEDICAL CORPS
UNITED STATES NAVY

OCTOBER, 1919
(NUMBER 11)



WASHINGTON
GOVERNMENT PRINTING OFFICE
1919

NAVY DEPARTMENT,
Washington, March 20, 1907.

This United States Naval Medical Bulletin is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

SUBSCRIPTION PRICE OF THE SUPPLEMENT.

For copies of the SUPPLEMENT address Superintendent of Documents, Government Printing Office, Washington, D. C., inclosing 5 cents in cash or by money order.

(2)



TABLE OF CONTENTS.

	Page.
PREFACE	5
IMMUNITY	7
DUTY IN SANTO DOMINGO	12
COURSE IN BACTERIOLOGY	16
GUAM	30
INTRODUCTION TO CHEMISTRY	35
WITH THE GENDARMERIE D'HAITI	38
NAVAL HOSPITAL CORPSMEN IN ACTION WITH MARINES	41
INSTRUCTION OF HOSPITAL CORPS ABOARD SHIP	59
THE ROENTGEN-RAY TUBE	67
SPECIAL INSTRUCTION AT THE SCHOOL FOR NAVAL PHARMACISTS	70
SANITARY GARBAGE SYSTEM	73
A SICK BAY DE LUXE	74
NAVAL MEDICAL EXHIBIT	77
CLIPPINGS	83
HOSPITAL CORPS NEWS:	
Philadelphia College of Pharmacy.—Present status of Hospital Corps.—Enlistment, reenlistment, and demobilization.—Hospital Corps legislation	87
HOSPITAL CORPSMEN COMMENDED	95
PROMOTIONS	103
CORRESPONDENCE COURSE FOR NAVAL PHARMACISTS	108
CLERICAL WORK IN THE MEDICAL DEPARTMENT, UNITED STATES NAVY	124
TO PHARMACISTS	162
NOTICE TO ALL PHARMACISTS AND HOSPITAL CORPSMEN	162
PREPARATION OF MANUSCRIPTS	163
CONTRIBUTIONS	164

TABLE OF CONTENTS

1	THE HISTORY OF THE UNITED STATES
2	THE HISTORY OF THE UNITED STATES
3	THE HISTORY OF THE UNITED STATES
4	THE HISTORY OF THE UNITED STATES
5	THE HISTORY OF THE UNITED STATES
6	THE HISTORY OF THE UNITED STATES
7	THE HISTORY OF THE UNITED STATES
8	THE HISTORY OF THE UNITED STATES
9	THE HISTORY OF THE UNITED STATES
10	THE HISTORY OF THE UNITED STATES
11	THE HISTORY OF THE UNITED STATES
12	THE HISTORY OF THE UNITED STATES
13	THE HISTORY OF THE UNITED STATES
14	THE HISTORY OF THE UNITED STATES
15	THE HISTORY OF THE UNITED STATES
16	THE HISTORY OF THE UNITED STATES
17	THE HISTORY OF THE UNITED STATES
18	THE HISTORY OF THE UNITED STATES
19	THE HISTORY OF THE UNITED STATES
20	THE HISTORY OF THE UNITED STATES
21	THE HISTORY OF THE UNITED STATES
22	THE HISTORY OF THE UNITED STATES
23	THE HISTORY OF THE UNITED STATES
24	THE HISTORY OF THE UNITED STATES
25	THE HISTORY OF THE UNITED STATES
26	THE HISTORY OF THE UNITED STATES
27	THE HISTORY OF THE UNITED STATES
28	THE HISTORY OF THE UNITED STATES
29	THE HISTORY OF THE UNITED STATES
30	THE HISTORY OF THE UNITED STATES
31	THE HISTORY OF THE UNITED STATES
32	THE HISTORY OF THE UNITED STATES
33	THE HISTORY OF THE UNITED STATES
34	THE HISTORY OF THE UNITED STATES
35	THE HISTORY OF THE UNITED STATES
36	THE HISTORY OF THE UNITED STATES
37	THE HISTORY OF THE UNITED STATES
38	THE HISTORY OF THE UNITED STATES
39	THE HISTORY OF THE UNITED STATES
40	THE HISTORY OF THE UNITED STATES
41	THE HISTORY OF THE UNITED STATES
42	THE HISTORY OF THE UNITED STATES
43	THE HISTORY OF THE UNITED STATES
44	THE HISTORY OF THE UNITED STATES
45	THE HISTORY OF THE UNITED STATES
46	THE HISTORY OF THE UNITED STATES
47	THE HISTORY OF THE UNITED STATES
48	THE HISTORY OF THE UNITED STATES
49	THE HISTORY OF THE UNITED STATES
50	THE HISTORY OF THE UNITED STATES

PREFACE.

From the first issue of the United States Naval Medical Bulletin it has been intended as a vehicle of communication with the Hospital Corps, and to be the means of imparting information and instruction to it as well as to the Medical Corps of the Navy. The recent expansion and improvement of the Hospital Corps seems now to justify more direct methods, and the material prepared for that body will hereafter be issued in the form of a SUPPLEMENT.¹

Contributions for the SUPPLEMENT are desired from members of the Hospital Corps and from other sources, but the Bureau does not necessarily undertake to indorse all views and opinion expressed in these pages.

W. C. BRAISTED,
Surgeon General United States Navy.

¹The present issue is No. 11. Nos. 1 and 2 appeared incorporated in the July and October issues, 1917, respectively, of the United States Naval Medical Bulletin.

A DISCUSSION ON IMMUNITY.

R. H. LAXING, Lieutenant Commander, Medical Corps, United States Navy.

As we scan the list of causes of sickness and death in a community or hospital, we readily see that by far the greatest part of the misery is caused by so-called infections. By infection we mean that the body has become the host for some harmful microorganism; e. g.: Typhoid fever is caused by the bacillus typhosus living and propagating in the blood and other tissues of the body; syphilis is caused by the treponema pallidum living and propagating in the tissues of man; malaria is caused by the plasmodium of malaria propagating and producing the symptoms characteristic of this disease, and so on down the list. We also see that whereas some who become infected by the microorganisms of disease die, others get well; and that some have a light attack of the disease caused by the infection, while others are very sick. Why is it that the incubation period for one infectious disease is three to four days while that for another is as many weeks? We all know that when we sit around with cold, wet feet or sit in a "draft" we are very liable to "catch cold," which is nothing but an infection, or to contract pneumonia; and we also know that living in poorly ventilated compartments or spaces makes us particularly susceptible to tuberculosis. The above are some of the phenomena which we are observing every day, and the inquiring mind asks why. The reasons for these phenomena have engaged the thought and diligent work of many of the most brilliant minds of the world. As a result of these studies certain facts have been discovered which not only explain these phenomena but which have become the foundations of scientific medicine and surgery, involving not only therapeutics, or the treatment of disease, but also the diagnosis of the same, as, for example, the Wassermann test for syphilis and the so-called Widal reaction in typhoid fever.

The study of the causes of the above phenomena has developed the corner stones of scientific medicine, and the facts discovered have made possible the performance of delicate tests to solve involved problems in the courts of justice, the guilt or innocence of parties in the courts turning on the outcome of these delicate tests. The study of the underlying principles which have so influenced medicine and surgery within the last half century is called immunology, or the study of immunity, and it is the purpose of this

short paper to bring out some of the salient points in this important subject, trusting that it may stimulate at least a few Hospital Corpsmen of the Navy to delve more fully into this fascinating study.

Immunity is defined as the power to resist infection which certain living organisms possess. Susceptibility to disease is the condition opposite to immunity, and resistance to disease has practically the same significance as immunity. A condition closely allied to immunity is what is called "tolerance" to drugs. We are all familiar with the so-called "dope fiend," when a man by repeated doses of a habit-forming drug has so accustomed his body to the action of the drug that in order to get the "effect" of it he must introduce into his system quantities far in excess of the amount required when the use of the drug was first started. In so-called "tolerance" no antibodies are formed in the blood, as is found in true immunity. Familiar examples of drug tolerance are the morphine fiends, cocaine fiends, and those with the tobacco habit.

There are all gradations and various kinds of immunity. It varies in degree from the weakest appreciable amount to absolute protection. It also varies greatly in duration from the briefest period to a lifetime.

An example of short-lived immunity is the infection termed "common cold," while an example of a long-lived immunity is that obtained by an attack of smallpox. The fact that a microorganism is pathologic or disease producing in one host and not in another depends on the presence or absence of immunity; for example, the lower animals are immune to syphilis, whereas man is susceptible.

There are various factors which play parts in rendering a person immune to infection, and in one type of infection a certain set of these factors will play the most important part, while in another, another set of factors will play the most important part. The study of these factors which are involved in the production of immunity in the various infections is generally termed the study of the mechanism of immunity. The factors which comprise the mechanism of immunity may be put into two divisions; viz, the part played by so-called phagocytes, and the part played by the so-called antibodies circulating in the body fluids. The great man whose name is linked with the discovery of the phagocyte and the part played by it in the mechanism of immunity was Metchnikoff, and his great contribution to human knowledge goes under the name of Metchnikoff's cellular theory of immunity. The great scientist who has added most to the knowledge of the antibodies and the part played by them in the mechanism of immunity was Ehrlich, and the part played by the antibodies in the mechanisms of immunity as studied and given to the world by this great man is termed Ehrlich's humoral or side-chain theory of immunity. In the mech-

anism of immunity to such diseases as pneumonia, pus infections, etc., the phagocytes play the most important part, while in that to such diseases as typhoid, cholera, etc., the antibodies play the most important part.

The word "phagocyte" means an eating cell. If you will stain up a smear of pus and examine it under the microscope, you will see live and dead leucocytes and other cells, and live and dead bacteria; you will observe lying in these cells bacteria which have been engulfed by the leucocytes. In other words, there has been a battle royal between the phagocytes and the invading microorganisms, the phagocytes doing their best to repel the invasion of microorganisms by incorporating them in themselves. There are various cells of the body which act as phagocytes, and these are divided into two classes; viz, the free phagocytes and the fixed phagocytes. The free phagocytes are leucocytes, lymphocytes, and other blood cells, as the myelocytes of the bone marrow. The fixed phagocytes are the connective tissue and endothelial cells. The free phagocytes play a much more important part than the fixed ones, as a general rule, in the mechanism of immunity. Depending on the type of invading microorganisms, the type of phagocytes differs. For example, the large mononuclear cells play a big part in the fight against protozoal organisms, while polymorphonuclear leucocytes play a more important part in the fight against such microorganisms as streptococci, staphylococci, and pneumococci. When a man has become infected by one of these microorganisms causing such diseased conditions as abscess or pneumonia, and a white blood count is taken, it is found that the number of polymorphonuclear leucocytes, these being the phagocytes which play the most important part in the fight against these infections, is increased to sometimes three and four times the normal number. Thus the white blood count in pneumonia is sometimes up to 40,000, while the normal count is around 8,000.

If you take two rabbits, inject into the peritoneal cavity of one repeated doses of dead cholera organisms, and then draw out some of the peritoneal exudate from each one of the animals, and mix live cholera microorganisms with the peritoneal exudate of each and then examine the mixtures under the microscope certain phenomena will be seen to be taking place. In the peritoneal exudate taken from the rabbit that has been injected with the dead cholera organisms, the live cholera bacilli will be seen to gradually clump together, while in the other specimen the microorganisms will be seen to swim around as if in water. If you give a man antityphoid inoculations and then draw off and mix some of his serum with some live typhoid microorganisms and examine the mixture under the microscope, the latter will soon be seen to stop moving and then clump together, whereas the serum from a man who has never had typhoid fever or

antityphoid inoculation will cause no such change. These phenomena are caused by the presence of so-called antibodies in the blood of the animal or person who has been injected. The dead cholera microorganisms and typhoid bacilli whose injection caused the formation of antibodies in the above illustrations constitute what is called antigen. Any substance whose injection into the body causes the body to throw off antibodies is called antigen.

There are various kinds of antibodies. The most important ones are antitoxins, agglutinins, lysins, precipitins, anaphylactins, and opsonins. Antitoxins are antibodies which combine with toxins and render them harmless, and in this case the antigen is the toxin which is injected into a person or is elaborated in his system by the growth of a microorganism. Agglutinin is an antibody which so acts on bacteria as to make them clump together. Lysins are antibodies which so act on bacteria or other cells as to make them dissolve. Precipitins are antibodies which cause the precipitation of their corresponding antigens. Anaphylactins are antibodies due to the injection into the body of some foreign protein which so acts on this foreign protein as to split it up, the symptoms of anaphylaxis resulting therefrom. Opsonins are antibodies which so act on bacteria that they can be devoured by the phagocytes. Opsonins therefore are the connecting link between the part played by the phagocytes and that played by antibodies in immunity.

An antigen may produce a variety of antibodies, e. g., its injection into a body may cause that body to produce an agglutinin, a lysin and perhaps other substances. However these antibodies will act only against one particular antigen. In other words if the antigen is the typhoid bacillus, for instance, the agglutinins and lysins produced in the body into which the typhoid bacillus is injected will cause the agglutination and dissolution of the typhoid bacillus, but not of another organism. In other words, antigens are specific.

The presence of an increased number of phagocytes and of antibodies in the blood is of great value in the diagnosis of disease. The Widal reaction in typhoid, the Wassermann reaction in syphilis, the precipitin reaction in determining the character of bloodstains, the high white blood count of pneumonia, and appendicitis are familiar examples.

Immunity may be natural or acquired and acquired immunity may be active, passive, or mixed, i. e., a combination of active and passive. Natural immunity is an inherited character possessed in common by all individuals of a given species. It may be present at birth or develop in later years. A common example of natural immunity is the immunity of lower animals to measles, scarlet fever, mumps, whooping cough, etc. Acquired immunity is that kind of immunity which is not naturally inherited in all the individuals of a species

but is the immunity acquired during the lifetime of an individual. Immunity may be acquired either through some natural event such as an attack of the disease or may be artificially induced by the introduction of some substance such as a serum, toxin, vaccine, or virus, and of course this is acquired immunity.

Active immunity is that form of immunity in which the body which is rendered immune is made to produce its own antibodies by the injection of vaccines, e. g., typhoid vaccine or by having the disease. Passive immunity is that form of immunity in which another organism is made to produce the antibodies and these antibodies are removed and injected into the person to be rendered immune, e. g., immunization to diphtheria by injection of antibodies produced in a horse in the shape of antidiphtheritic serum. Active immunity is more lasting than passive immunity. For example, smallpox vaccination renders a person immune for years; whereas a dose of antidiphtheritic serum renders a person immune only for a couple of weeks.

Active immunity may be acquired by—

- (a) An attack of a disease.
- (b) By introduction of a virus.
- (c) By introduction of a vaccine.
- (d) By introduction of a chemical product (toxin).

Those who have been rendered immune to typhoid fever either by having had the disease or by the inoculation of vaccine have in their blood antibodies such as agglutinins and lysins.

The conditions known as depressed vitality, lowered tone, general debility, weakened constitution, lowered resistance, etc., imply conditions in which immunity to certain diseases such as tuberculosis, pneumonia, common "colds," and septic infections is lowered. These conditions do not affect immunity to such diseases as smallpox, measles, whooping cough, yellow fever, etc. This so-called lowering of resistance is probably due to the effect of the following causes on phagocytes and antibodies circulating in the blood; exposure to wet and cold, fatigue, insufficient sleep and rest, worry and excesses of all kinds. The effect of cold on the agents of immunity can be seen in the laboratory. For example, if you mix together some leucocytes and bacteria, and keep one part of this mixture at body temperature, and another part below body temperature, it can be shown that the phagocytes in a specimen kept at body temperature are much more active and devour more bacteria than those in the specimen kept below body temperature. The same sort of phenomenon can be observed in relation to antibodies.

From the above short discussion on immunity it can be seen how important the subject is. The further you delve into the subject the more fascinating it becomes.

DUTY IN SANTO DOMINGO WITH U. S. MARINES.

By LEO C. HASPEL, Pharmacists Mate, 2 C, United States Navy.

As the Medical Department of the United States Navy has been taking care of the medical end of the Marine Corps, a hospital corpsman attached to a marine regiment has plenty of chances for independent duty, especially in the Tropics.

In the year 1918 I had 10 months of active field duty with the marines in the Tropics in Santo Domingo acting as a hospital corpsman on duty independent of a medical officer. I started out with a detachment of 40 marines with a captain in command and no medical officer to take part in a campaign against the Dominican bandits operating in the section of Seibo. My outfit consisted of one field pouch. We hiked three days of hard going to get to the town of Seibo, where we established a base.

After considerable search I located a large barnlike structure with plenty of room, and this we converted into a barracks. After a week's stay it was found that many mosquitoes prevailed, it being in the center of the town and near the Socco River. We recommended that a more sanitary barracks be built on the outskirts of the town where there was a good breeze at all times.

My next problem was to establish a sick bay for the care of the sick and wounded, and for this purpose I secured the best building obtainable. Improvised bunks were made by each man using his shelter half (a canvaslike cloth with which each marine is furnished upon entering the service, and used when necessary as a dog tent) and limbs of trees to support it. Next I built a table which I used for dressing cases and minor operations. Water was obtained by putting large tanks under the rainspouts, and this water was reserved for the use of the sick only. This fitted me for taking care of any cases that might arise.

The water proposition for the barracks was a difficult one, all water being obtained from a river on the outskirts of the town, where people bathed and washed clothes. Instructions were at once issued to the natives to wash and bathe below town and take drinking water from above. The water for use at the barracks was first boiled and then filtered by the use of a filter improvised on the order of a Darnall filter. This is done by taking a large barrel and putting a layer of coarse sand or gravel in the bottom of it. Then put a small barrel with the bottom perforated inside of this, letting it rest on the sand or gravel. Next put a layer of fine sand about 6 inches on this, then a layer of charcoal on the fine sand, and finally a layer of gravel on the charcoal. Pour water into the barrel, and it will filter through the gravel, charcoal, and sand and rise in the smaller barrel.



MARINES READY TO START IN PURSUIT OF NATIVE OUTLAWS.



A TYPICAL CAMP FOR A ONE-NIGHT HALT.



MOUNTED MARINES ON THE TRAIL.



THESE MARINES HAVE JUST TAKEN POSSESSION OF A BANDIT STRONGHOLD. THE STRUGGLE FOR IT COST SEVEN OUTLAWS THEIR LIVES.

In this way good water was secured when the troops were not hiking. On hikes we had to take great precautions, as the water in the hills was scarce and contaminated. When I was in doubt, and we were making camp for the night, I had plenty of water boiled before turning in and each man filled his canteen with this water, then placed it in the stream and by morning it would be very cool. This supply, about 1 quart, with careful use would generally last a man practically all the next day.

One meets with many hard propositions while on hikes with no medical officer present, as hikes last from 10 to 15 days without return to a base, and a hospital corpsman has to care for sore feet, insect bites, boils, fevers, diarrhea, and dysentery, such diseases prevailing at all times. A hospital corpsman's wits are often tested, especially in engagements with the bandits in the thick brush far away from his base. If there are any sick or wounded, first aid must be given and then comes the job of getting suitable transportation for the wounded. Two methods are available, horse or litter transportation. I had two men wounded at the same time and was 22 miles from the nearest medical officer. One was shot through the back, the bullet entering just below the right shoulderblade and coming out at the right side of the body. The patient was able to ride a horse as there was little hemorrhage. In the other case the bullet entered the left groin, passing through the scrotum and coming out of right thigh. This man had to be carried on a rude stretcher and we had to use care in transporting him as he was suffering very much. I gave him one-fourth of a grain of morphine to ease his pain and got him to Seibo in fairly good shape.

Men on this kind of duty are always ready to eat and drink anything in the line of fruits and liquids, which are very abundant in the Tropics. A hospital corpsman has a job on his hands and must use all his authority in cautioning the men against their danger, as water and fruits cause diarrhea.

It is often necessary to take a certain amount of authority upon yourself in order to protect the men against the dangers of eating questionable food. In some cases your commanding officer will order a certain food for the men which you know is unsafe for them to eat; and so you are called upon to exercise diplomacy in telling the commanding officer that such foods are unsafe in such a manner as to get his backing.

Hospital corpsmen meet many fakers and neurasthenics and good sense must be used, as men at all times try to get excused from hikes. In such cases it is well to recommend to the commanding officer that such person be given extra police duty for a few days, and this will not encourage other men to try the same practice.

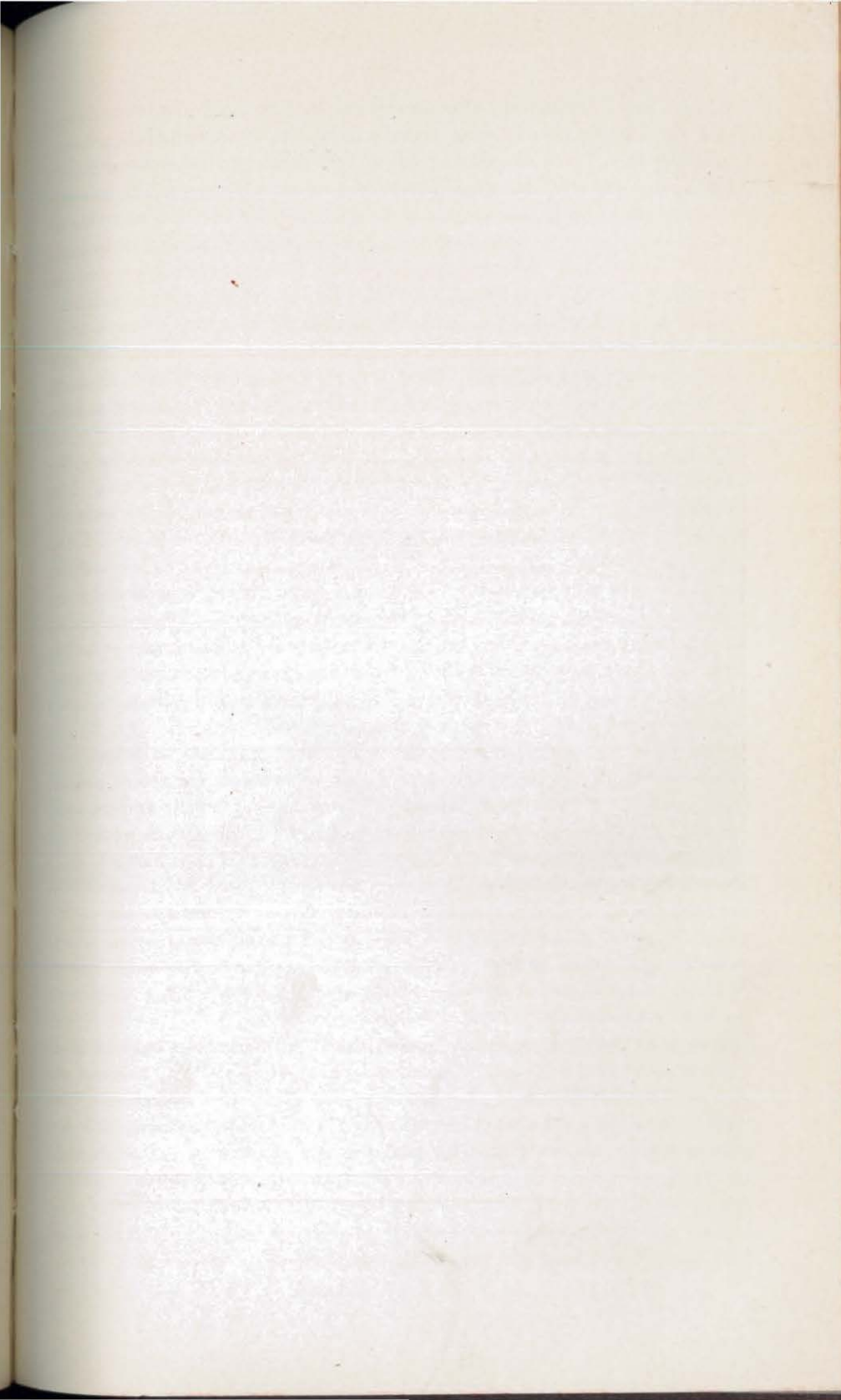
Be fair to every one of your companions and then you will never have the occasion to embitter them by what they deem unfair recommendations. The average marine on field duty can find any number of ills which he considers incapacitate him for hiking, and in having no intimate friends you will be impartial in your opinion as to their ability to do duty. Believe what you see and not what is told to you.

For the first 135 days in the hills I had but one man admitted to the sick list, this case being a slight attack of dengue fever, and during this time we were on hikes lasting as long as 14 days at a time. If in any case you are in doubt as to the treatment of the sick or wounded do not fail to summon a medical officer, even though he be 40 or 50 miles off; use every effort to get him by radio or otherwise rather than move the patient to him.

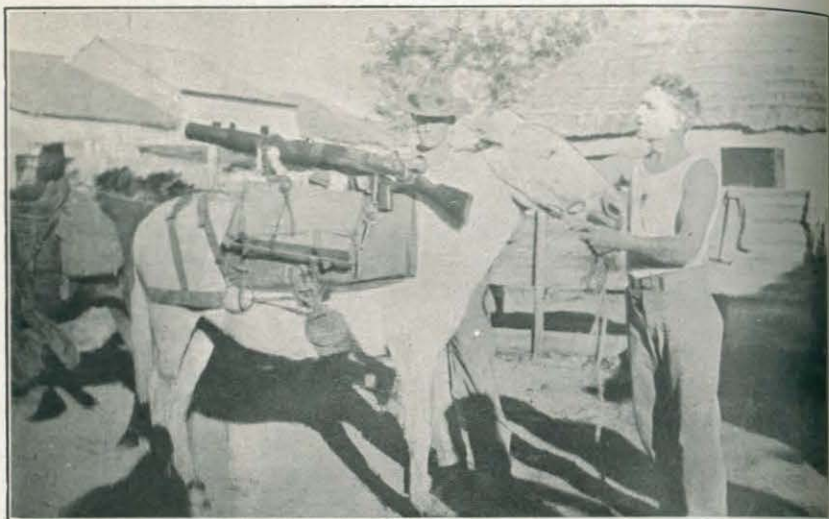
At all times I kept in mind the nature and peculiarities of all the men by asking them about possible idiosyncrasies for medicines. By doing this I saved myself from a serious predicament in the case of a marine wounded in the hand. The first-aid treatment is iodine, and had I not discovered that the patient was subject to iodine poison I would most likely have had a case of acute poisoning to treat. While on hikes I always carried a quantity of rum, quinine, and ginger root, the latter being obtainable in the hills, and after a wet day I gave the men a ration of quinine, grains x, and hot ginger tea with about an ounce of rum. This method was excellent in controlling fevers.

Diarrhea and dysentery were hard to prevent, due to improper foods, water, fruits, and honey, the latter being more troublesome than all the others, as men generally have a sweet tooth, and in our section it was quite abundant. I used bismuth subnitrate grains x and salol grains v with good effect. In giving this treatment I first gave the patient an ounce of castor oil before breakfast, and after the first good bowel movement I started him on the bismuth and salol every four hours. In cases of dysentery, I used emetine with good results, giving one-third of a grain every other day for 10 days, keeping patient on soft diet. In this way I had very few cases of dysentery or diarrhea.

There were many cases of insect bites and stings because of the character of duty. In this country there are what are known as chigoes (jiggers), a small flea the size of a pin point, which when it bites burrows deep in the skin and very few antiseptics will kill it, a solution of salicylic acid 10 per cent in alcohol being probably the best. A man who is afflicted with many of these bites naturally starts to scratch them and as a result causes an infection, which if not attended to immediately will develop into a large tropical ulcer. When they reach this stage they require a long course of treatment. Even



Supplement to Naval Medical Bulletin, October, 1919.



PREPARING FOR A HIKE.

though the ulcer be small, if on the lower extremities, it will cause a swelling of the lymph glands, rendering the patient unfit for hiking. This disease is by far more serious to a detachment of men serving in Santo Domingo than the majority of others. In the prevention of the infection of insect bites I had all the men, after each day's hike, if possible, take a sponge bath of bichloride solution 1-2,000. This helped considerably.

During the epidemic of influenza we had 85 men of the National Dominican Guard sick with the disease, and as the Marines were more or less in contact with these guards, careful watching and the prophylactic of a quinine gargle 1-10,000 and throat sprays of Dobbell's solution prevented the spread of this disease, there being only four slight cases and one serious case among our men.

For the use of the native population barrels of quinine solution 1-10,000 were distributed through the town for each home by a committee consisting of young men of the town, who made rounds three times each day and saw that each family took their gargles. The committee kept a record of all gargles. This plan confined the epidemic to the guards only, there being only two suspicious cases among the civilians. Of the cases among the guards, we lost three.

The one serious case we had was a Marine, who later developed a pneumonia which we thought would be fatal, but to my good fortune a medical officer was present and the treatment was prescribed by him. In treating this case we used the chloroform and alcohol treatment, using a piece of cotton the size of a marble saturated in alcohol and dropping on it 15 drops of chloroform, which was placed between the patient's teeth, he breathing through the saturated ball of cotton and exhaling through his nose. This treatment was begun at 8 o'clock in the morning and continued at intervals of 15 minutes for 12 hours. The patient recovered in a few days.

For the first three or four months this kind of duty is appealing, as one sees many new attractions, but the charm soon passes off, and in my estimation three to four months of active field duty in the Tropics is sufficient for any man. At the expiration of that time he should be sent to a permanent camp where he can rest up and get a little diversion. It is my observation that men on active field duty for a space of 10 months are liable to pernicious malaria and dysentery, and the sick list will always be large in the case of such men.

I also wish to state that if a Hospital Corpsman doing duty in the United States wishes to see a real line of Hospital Corps work, he should come to Santo Domingo.

COURSE IN BACTERIOLOGY.

Compiled from text issued by PARKE, DAVIS & Co. and utilized by their permission.

BACTERIOLOGY I.

Bacteria are single masses of vegetable life consisting of single cells. Cells are minute masses of matter entering into the formation of vegetable or animal tissue.

Bacteria are so small that it is impossible to measure them by any ordinary methods. A special scale for use with a microscope has been devised, and the unit of measurement is called a micron. It takes 25,400 microns to equal 1 inch of the ordinary foot rule. As bacteria on the average are seldom longer than $1\frac{1}{2}$ microns, it will be seen that about 25,000 bacteria placed end to end will only equal an inch in length, and that a space of an inch square can easily contain more than 600,000,000 bacteria, and a great many times that number in the case of some of the smaller species.

Bacteria are found nearly everywhere. They are on particles of dust in the air; in and on the soil; they are on the surface of such things as paper, desks, chairs, clothing, etc.; they are in the water, in milk, in food; they are on the skin, the hair, the hands, on and under the finger nails; on the teeth, the tongue, and on the mucous membranes lining the mouth, the stomach, the intestines and the upper part of the breathing apparatus. The lower animals, as well as human beings, harbor innumerable bacteria.

Usually bacteria are not present on some of the mucous membranes—those lining the bladder, the kidney, and the lungs, for instance; nor are they present in the healthy tissues of plants or animals.

CLASSIFICATION.

There are two main groups—disease-producing and nondisease-producing bacteria. The disease-producing bacteria are called pathogenic bacteria. Those which do not produce disease are called nonpathogenic bacteria. Bacteria are further classified according to the way they reproduce themselves. The lower forms multiply by simple division. That is to say, each cell at a certain stage divides into two other cells, and each of these new masses again divides into two more, and so on. One cell splitting into two cells is called simple division.

This simple-division group or class of bacteria we again subdivide according to their morphology (shape), as follows:

1. *Cocci*.—These are small, globular bacteria. They look like little round dots under the microscope.

2. *Bacilli*.—These are small rods and under the microscope look something like a hyphen.

3. *Spirilla*.—These are little rod-shaped organisms which look something like the letter "S." As their designation indicates, they are spiral.

There are other so-called "higher" forms of bacteria, but we are not concerned with them at present, as they are not so closely related to biologic therapy.

REPRODUCTION AMONG THE LOWER BACTERIA.

The lower forms of bacteria, placed in favorable circumstances, multiply by "fission"—a term meaning the simple division of the cell into two other organisms. Each cell becomes narrower around its circumference through the center, as if a string or cord were drawn tightly around it, and after a time the cell divides at this line, with the result that two cells exist where one existed before.

This reproduction goes on with almost unbelievable rapidity. A single cell may reach maturity and divide into two others in from 20 to 30 minutes. By simple mathematical calculation it is determined that if a single cell divides into two others only once every hour, one cell, in 24 hours, will produce 17,000,000 similar cells.

Certain bacterial cells, however, such, for instance, as the bacterium causing tuberculosis, multiply much more slowly.

Certain kinds of bacterial cells are capable of forming what are known as spores. Spore formation does not mean a kind of reproduction, but rather a change in the cell substance which results in the appearance of a dense globular mass. According to bacteriologists, this period of spore formation represents a stage of bacterial life when a cell is "resting."

During the spore-forming period bacterial cells are highly resistant to such destructive agents as antiseptics, germicides, and the like.

MOTILITY.

Certain kinds of bacterial cells have the power to move about in liquids. This power of motion depends upon the presence of delicate whip-like appendages, called flagella, extending out from the walls of the cells; by constant lashing of these flagella the organisms are propelled, so that they move about. This motion can be seen very nicely under the microscope under certain conditions. The typhoid bacillus has this power of motion quite highly developed.

Other bacterial cells do not have the power to move about independently and they are, therefore, termed "nonmotile" cells.

These nonmotile cells, or even dead bacterial cells, sometimes appear to be moving when looked at under a microscope. This false, or

"brownian," movement which is sometimes mistaken for direct independent motion is not true motility, but a sort of quivering motion due to vibration and not to any movement of the cell itself. A little careful observation under the microscope will enable one to distinguish very easily between true motility and the so-called "brownian" movement.

CAPSULES.

Many species of bacterial cells are inclosed in a delicate capsule, something like gelatin, which, under certain conditions, may be very easily seen. Certain other bacterial cells have a capsule also, but these are very difficult to distinguish except by the use of stains.

FUNCTIONS OF BACTERIA.

Bacterial cell action takes complex chemical combinations of organic substances and breaks them up into simpler combinations.

Putrefaction and fermentation are two well-known evidences of bacterial activity. When one sees a dead animal, such as a dog or cat, putrefy, it is known that a chemical process is being carried on by bacterial cells; and if this process goes far enough, all of the animal will finally disappear but the skeleton. Liquids which have developed during the process will sink into the ground, and the gases which have also developed during the process will dissipate into the air. If it were not for bacterial cells the dead animal would remain unchanged. When an animal or a human being is embalmed this is done to prevent putrefaction, and the embalming process simply protects the body against the action of bacterial cells. The bacterial cells, therefore, act as scavengers; but this is not their only function, since bacterial cells are made use of in a great many industries, such as dairy work and in the preparation of malted and fermented liquids. It must not be understood that the mission of all bacteria is harmful.

Only a small number of bacteria are the cause of disease. But while the number of pathogenic (disease producing) bacteria is very small in comparison with the number of nonpathogenic bacteria, the results of the disease-producing bacteria are so great, so important, and so widespread that many people are accustomed to think that all bacteria produce disease.

BACTERIOLOGY II.

The growth of bacteria is greatly influenced by surroundings, certain conditions being favorable and others unfavorable.

First comes the matter of food, for all bacteria require nourishment. The statement that certain bacteria can flourish in clean,

distilled water is untrue, for they soon die and disappear. Some can live in distilled water which contains an infinitesimal amount of organic matter, and others require concentrated food, such as the various culture media, blood serum (the liquid part of blood), and other body fluids. All bacteria require the presence of nitrogen in some form, and they all grow best where albuminous material of a "diffusible" nature is present. By "diffusible" we mean capable of passing through animal membranes. Nearly all bacteria require the presence of organic matter, and many disease-producing bacteria will grow only in the presence of fluids taken from the bodies of animals.

A certain amount of water is indispensable to the growth of bacteria, although the amount may be exceedingly small.

Different bacteria differ very greatly in their resistance to drying. Many do not survive prolonged drying, while, on the other hand, some of them, such as those causing anthrax and blackleg, may be dried for years without being destroyed. The bacteria causing tuberculosis may be dried for a long time without dying. This is one of the reasons why boards of health object to people spitting on sidewalks, floors, etc. The dry sputum is ground up by the feet, disseminated in the air and breathed into the lungs, thus bringing about infection.

All bacteria must have oxygen in some form in order to live, and the majority of them grow best when freely exposed to the air. Some bacteria, however, will not grow at all where free oxygen is present, but secure what they need by splitting up chemical combinations of oxygen, thus generating enough for their requirements. These peculiarities divide bacteria into three classes:

1. Those which grow in the presence of free oxygen. They are called "aërobes."

2. Those which do not grow in the presence of free oxygen. They are called "anaërobes."

3. Those which grow under either condition. These are known as "optional" or "facultative" aërobes.

Examples: (1) The bacteria causing tuberculosis will grow only in the presence of free oxygen. They are, therefore, "aërobic" bacteria. (2) The bacteria causing tetanus (lockjaw) will not develop at all where any free oxygen is present and are, therefore, "anaërobic." (3) The cocci causing suppuration (boils, abscesses, etc.), the bacillus causing typhoid fever, and the spirillum causing cholera (in fact, most of the common disease-producing bacteria) grow with or without free oxygen and are, therefore, "facultative" or "optional" aërobes.

The temperature at which each kind of bacterium thrives best is called the "optimum" temperature. Growth may occur, however, both above and below this point. The "maximum" temperature is the point above which growth does not occur, and the "minimum" temperature is the point below which growth does not occur. Disease-producing bacteria grow best at about the temperature of the human body, and many lose their disease-producing power when grown at temperatures much above or much below body temperature. A temperature considerably above the optimum is usually more harmful to bacterial life than a temperature much below the optimum, as the resistance of many bacteria to low temperatures is astonishing.

Cold prevents the growth of all bacteria and freezing destroys many, though not all, for some bacteria and most spores seem capable of resisting almost any degree of cold. The bacteria of diphtheria have been exposed for 30 minutes, and the bacteria of typhoid for 60 minutes, to a temperature 200 F. below zero without being destroyed.

Bacteria grow best in the dark or in diffuse light. The direct rays of the sun, and, to a less degree, the rays of the electric arc light, prevent the growth of most bacteria, and in many cases kill them. The disease-producing power of most pathogenic bacteria is greatly weakened if they are kept in the light.

Bacteria sometimes grow better, and in the case of pathogenic organisms their disease-producing power may be increased, when associated with other species. On the other hand, the presence of one kind of bacteria may be harmful to the growth of another, or even entirely destroy it.

A small quantity of certain chemical agents, especially certain of the mineral salts, in an otherwise perfectly suitable culture material, may completely prevent the development of bacteria, and if added in greater amounts may destroy the bacteria. Substances which prevent the growth or development of bacteria are called "antiseptics," common salt and alcohol being examples. Substances which destroy them are called "germicides" or "disinfectants," bichloride of mercury and carbolic acid being examples.

It will be seen, then, that the principal factors in connection with the growth of bacteria are food, moisture, oxygen, temperature, light, and association.

BACTERIOLOGY III.

The great advantage of studying living bacteria is that we learn their true shapes, sizes, groupings, movements, and life histories. The study of living bacteria is somewhat difficult, however, because

of their very small size, and because, being transparent, they are difficult to see through a microscope.

Most bacteria are much changed after they have been passed through several chemical reagents and stained. It is, therefore, necessary to examine them not only in the living condition, but to make comparisons with stained specimens. Aniline dyes are used for coloring purposes.

The simplest method of observing live bacteria is to take a small drop of liquid containing them, place it on a "cover slip" (a very thin piece of glass), and invert this over a glass slide with a little hollow space ground in the center. This is what is called the "hanging-drop" method of observing bacteria through the microscope.

In order to study them accurately, bacteria must be taken from natural surroundings and artificially cultivated (grown) upon certain specially prepared materials. These special materials are called "culture media." A large number of mixtures have been used for this purpose, but a few which have been particularly satisfactory have become standards and are now used in almost every laboratory in the world.

The general requirements of artificial culture media are that they must (1) contain water; (2) provide food in an easily digested form; (3) be neutral or feebly alkaline in chemical reaction; (4) be sterile (free from bacteria); and (5) represent as nearly as possible the natural environment of the organism to be grown. Liquid, semisolid, and solid culture media are all employed, and some of the most useful ones can be liquefied or solidified at will.

In addition to these general considerations the culture media must be especially adapted to the peculiarities of the particular bacteria being studied. For instance, some bacteria demand sugar, while others require the use of blood or other body fluids. Here, briefly described, are the culture media most extensively employed:

Plain bouillon.—Filtered beef broth, containing a small amount of peptone and sodium chloride.

Glucose bouillon.—Bouillon containing certain definite percentages of some form of sugar, as glucose.

Gelatine.—Bouillon with the addition of gelatine. This culture medium is not only an excellent food for bacteria and transparent, like the bouillon, but it is solid at room temperature and can be made liquid or solid with only slight variation in the temperature.

Glycerin bouillon.—Bouillon containing a small amount of glycerin, usually 5 per cent.

Plain agar.—Bouillon containing a small amount of agar. Agar is derived from a certain kind of seaweed which comes from the East. It dissolves in water when heated to a sufficient degree and forms a thick jelly when cold. Culture medium made with agar is semitrans-

parent and more useful than gelatine, having the advantage of remaining solid at comparatively high temperatures, for the reason that it can not be melted except at nearly the temperature of boiling water.

Glycerin agar.—Agar culture material containing a small amount of glycerin.

Ascites agar.—This is plain agar containing a certain amount of sterile ascites fluid obtained from a patient suffering from dropsical conditions.

Loeffler's blood-serum mixture.—This is a mixture of bouillon and blood serum (the liquid part of blood) coagulated by heat.

Litmus milk.—Milk to which enough watery solution of litmus is added to give a distinct blue color.

In addition to culture medium, the study of bacteria requires certain apparatus. Platinum needles come under this head and consist of pieces of thin platinum wire of varying lengths and fastened to a small glass rod which serves as a handle. There are platinum loops similar to the platinum needles, except that the end of the wire is formed into a small loop, usually about one-eighth of an inch in diameter. For certain kinds of work the diameter of these platinum loops is accurately measured.

Then there are, of course, test tubes stoppered with cotton—ordinary glass test tubes and little plugs of common cotton. The cotton plug does not act like a cork, but rather as a filter. It admits air and also strains it. Before removing the stopper the outside of it is passed through a flame, usually generated by a Bunsen burner or an alcohol lamp, and any bacteria that may have found lodgment there are thus destroyed.

Petri dishes are also used. These are shallow glass dishes, with flat bottoms, and straight sides about one-half an inch high. There is a cover exactly like the bottom of the dish, but a trifle larger so that it can be fitted over it.

An incubator is a sort of oven like that used with a gas or an oil stove except that the walls and the top and the bottom are double and the intervening space filled with water which, when warmed by gas or electricity, tends to maintain a temperature which can be controlled by the joint use of a thermometer and a thermostat. While many bacteria thrive at the temperature of a well-warmed room, pathogenic bacteria must be kept at the temperature of the body in order to secure typical development. Many will not grow at all at other temperatures. To do this satisfactorily, the culture medium containing the bacteria is placed in the incubator for a certain length of time.

Sterilization is important, and to insure this the glassware, pots, kettles, tubes, and other materials used in the study of bacteria must be rendered free from bacterial contamination. This may be ac-

accomplished by heating in a dry-heat sterilizer, an ordinary oven in which the temperature can be maintained at a very high point. Another method is to use steam. The ordinary "steamer," constructed about like those found in kitchens, is used. Moist steam kills certain bacteria which can resist a very much higher temperature which is dry.

STERILIZATION AND DISINFECTION.

Before going further in the study of bacteria and of the means of growing or cultivating them, a comparatively thorough knowledge of the principles of sterilization and disinfection is required. We must understand the methods employed for getting rid of bacteria whose presence might ruin our experiments; and we must understand the methods employed for killing or getting rid of disease-producing bacteria in order that the spread of disease may be prevented.

These conditions may be brought about by a number of methods which may be divided or grouped into three general classes:

1. Heat.
2. Chemical agents.
3. Filtration.

When we employ heat or chemical agents we aim at killing the bacteria.

When we employ the process of filtration we aim at the removal of the bacteria without necessarily killing them.

The process of killing microorganisms (bacteria, bacterial cells) either by heat or the use of chemicals, or of removing them by filtration, is termed "sterilization." An object which is entirely free from bacteria or their spores is said to be "sterile," or "sterilized," or "aseptic." Chemical agents which cause the death of bacteria are called "germicides."

Certain substances whose action is injurious to bacteria and prevents their growth are termed "antiseptics." A room, or clothing, etc., which has been freed from disease-producing bacteria is said to have been "disinfected." The terms "disinfection" and "sterilization," and the terms "sterile" and "disinfected" are somewhat interchangeable, but technically speaking there are the slight differences just described.

STERILIZATION BY HEAT.

It was learned in a previous lecture that heat much above body temperature is destructive to certain bacteria. It was also learned that certain bacteria are capable of withstanding a very high degree of dry heat (hot air), but are unable to withstand moist heat. To

this must be added the statement that bacteria are sometimes destroyed by exposing them to flame. Heat may be applied in three forms as:

- (a) Dry hot air.
- (b) Moist heat.
- (c) Actual flame.

Dry hot air, for sterilizing purposes, is applied by means of what is known as a "hot-air sterilizer," which is like an ordinary oven such as we use on gas stoves or oil stoves. This oven has a thermometer installed in it, and some sterilizers are also equipped with a heat-regulating device which shuts off the flow of gas when the sterilizer gets too hot, or turns it on when the sterilizer gets too cool, and is called a "thermostat." Articles or substances are placed in this oven, or sterilizer, and subjected to a high temperature (about 300 F.) for an hour. This usually kills bacteria and their spores.

Many articles, such as dishes, glassware, knives, scissors, forceps, rubber stoppers, etc., may be sterilized by being boiled for a half hour or more. Articles which may be warped, cracked, or melted by such a high temperature as that used in the hot-air sterilizer may be boiled. The action of boiling water for 30 minutes or longer will kill most bacteria.

But it does not always kill spores, and sterilization conducted by this process must be carried out in a systematic manner. The article or substance must be subjected to the temperature of boiling water for 20 to 30 minutes—this kills the bacteria in the vegetative stage—and then placed aside for 24 hours to allow the spores to develop. When the 24 hours have passed the article or substance is again boiled for 30 minutes and the bacteria, which have passed from the spore to the vegetative stage, are killed. The process is repeated on the third day. This method is known as "intermittent" or "fractional" sterilization.

Sometimes it is necessary to subject an article or substance to a single prolonged exposure to a temperature lower than that of boiling water, for the reason that it may be injured or coagulated by exposure to a temperature as high as that of boiling water. This single prolonged exposure to temperature lower than boiling water is known as "pasteurization." Pasteurization is made use of in sterilizing milk and similar fluids, and is of service only when the bacteria to be killed are without spores and are not able to resist such low temperatures. When you hear of dairies advertising "pasteurized milk" you will know what they mean.

It has been proved by experiments that neither dry heat nor the action of boiling water will invariably and certainly kill all bacteria and their spores, and it follows that other means must be em-

ployed in certain cases. Another method is to subject the articles to be sterilized to the action of steam under pressure.

This is done by the use of a device known as an "autoclave," practically an air-tight compartment of heavy metal with a lid on the top, or a door on the side, fastened with several heavy clamps. A steam gauge is provided to register the pressure inside. The articles or substances to be sterilized are placed in the autoclave, the fastenings adjusted, and steam turned on. When the pressure reaches about 15 pounds, and this is kept up for 30 to 60 minutes, all the bacteria and all the spores are destroyed; the moist heat (steam) under this high pressure penetrates very deeply and "sterilizes" the objects thoroughly.

The process of applying direct fire is known as "flaming." The platinum wires used for transferring bacteria from one culture material to another are sterilized, for instance, by being held in the direct flame until they become hot. We can use an alcohol lamp or a Bunsen burner for this purpose. In sterilizing the wire the glass handle must also be held in the flame for at least half its length for a few minutes; otherwise carelessness in this respect might result in contamination.

Knives, scissors, forceps, and other instruments may be exposed to the direct flame for a short time, but as this is likely to affect the temper of the steel, other methods of sterilization are usually preferable.

Plugs of ordinary cotton which are used to stopper flasks and tubes are passed through the flame, which sets the cotton on fire, thus burning all of the bacteria on the surface of the cotton. The flame is then blown out before much of the cotton has been burned.

STERILIZATION BY CHEMICAL AGENTS.

A great variety of chemical agents is used for the purpose of sterilizing, a few of the better known ones being formaldehyde, bichloride of mercury, mercuric iodide, nitrate of silver, salicylic acid, potassium permanganate, carbolic acid, alcohol, and chlorinated lime. These chemicals are used in various strengths, solutions of the proper potency having been determined by a great many experiments. Some will kill bacteria in a very few minutes, while others require a longer time.

When chemical solutions are used for sterilizing inert objects, such as glassware, instruments, dishes, and the like, as a rule strong solutions may be used. On the other hand, when it is necessary to wash out wounds, or to sterilize the surface of the body for surgical operations, or to avoid contracting disease from handling infected persons, it is necessary to use solutions which will sterilize but which will not

irritate or destroy the tissues. This is why so many chemical agents have been tested to determine their disinfecting properties; it has been the endeavor to obtain chemical agents which are sufficiently powerful to kill disease-producing bacteria, and yet not strong enough to hurt or harm the patient.

STERILIZATION BY FILTRATION.

Many liquids can not be subjected to heat without losing their most important qualities. Such substances may be sterilized by filtration by forcing them through unglazed porcelain made from material sufficiently fine or dense to hold back the bacteria. This method is employed for the sterilization of such substances as bacterial toxins and antitoxins, and a number of drugs used hypodermatically. Again, certain materials used for the growing of bacteria, such as blood serum and ascites fluid, may be sterilized by passing them through unglazed porcelain filters.

Various substances have been used for filtration, such as crushed stone, sand, powdered glass, charcoal, etc., but these filters are unreliable; they do not sterilize. They do, however, purify to some degree, because they filter from the liquids the larger particles of undesirable material. But they allow bacteria to pass through.

The common commercial filters sold all over the country in hardware stores and other places for filtering drinking water are in this class. It is true you may take muddy, turbid water and render it clear by passing it through such filters, but the material which passes through may be alive with typhoid or other bacteria, just the same. The only safe way to sterilize drinking water is to either boil it, distill it, or pass it through a sterilized porcelain filter which is changed at least once every 24 hours.

GENERAL METHODS OF STUDY.

Examination by means of a powerful microscope constitutes the most important method of studying bacteria. We are thus enabled to determine which general class an organism belongs in (whether coccus, bacillus, or spirillum) and to ascertain some of its special characteristics. By means of a slide which is graduated for the purpose we are able to determine, in "microns," the length, breadth, and thickness of bacteria. We can learn of the presence or the absence of a capsule, and we can observe what is termed "grouping."

Some bacteria occur in pairs, lying two by two. These are called "diplococci."

Some occur so grouped as to look like a little cubic package or like a minute bale of cotton. Such a collection is called a "sarcina."

Sometimes the cocci are so arranged as to look like a string of beads, in which case they are called "streptococci." The streptococci are an important group of bacteria, and many of them are highly pathogenic, erysipelas, general blood poisoning, and puerperal fever being examples of their work.

Other bacteria are found in little clumps which look like bunches of grapes; these are called "staphylococci." The bacteria causing boils and many abscesses are members of the staphylococcus group.

Bacilli can usually be identified under the microscope on account of their rod-shaped appearance. However, they present a good deal of variation in their grouping, some occurring singly, others in clumps, still others lying end to end to form threads.

The question of whether bacteria have the power of motion is also determined by microscopic examination, as well as whether the motion, if present, is actual motility or only "brownian" movement.

The microscope enables us not only to determine whether bacteria produce spores, but to note the appearance and location of spores when they occur. For instance, the bacillus of tetanus (lockjaw) develops a spore at one end, and this gives it a characteristic appearance resembling a drumstick.

STAINING.

Another method of studying bacteria is to note their behavior toward certain dyes or stains. A great variety of stains and of methods of applying them have been developed. Some of these methods are simple, but others are highly technical. Roughly speaking, the usual method of staining bacteria is to transfer a small quantity of the material containing them to a "cover slip," which is a small piece of very thin, clear glass. The material on the "slip" is dried in the air and "fixed" by passing through the flame of an alcohol lamp or a Bunsen burner, after which a few drops of the stain are applied and allowed to remain in contact with the bacteria for a certain length of time. The excess of stain is washed off, and sometimes it is necessary to dip the cover slip in absolute alcohol. The slip is then placed on a glass slide and held in position with some sticky material, usually Canada balsam. This is called "mounting."

Some bacteria will absorb certain stains and become colored, while others will not. This difference constitutes a very important method of identification.

One of the most important methods of staining bacteria for purposes of identification is called "Gram's method," being named after the discoverer. The general statement may be repeated that while the majority of bacteria can be stained by this process some of them can not.

The bacteria which do stain under Gram's method are called "Gram-positive"; those which do not stain under Gram's method are known as "Gram-negative."

CULTURES.

The growing of bacteria is an extremely important method of determining their characteristics, and from it we are able to learn a great deal about their life histories. Some bacteria, growing under certain conditions, produce fermentation of the media they are in, and are called "zymogenic."

Others produce a luminous or phosphorescent appearance in the media, and are therefore called "photogenic."

Some produce putrefactive changes and are therefore called "saprophytic."

Innocuous materials are frequently changed into poisonous substances in this manner. When you hear of people suffering from "ptomaine poisoning," you will understand that this is due to the action of putrefactive bacteria on meat, fish, or other albuminous foodstuffs.

Frequently bacteria produce a decided color during their growth and are therefore called "chromogenic." Nearly all of the known colors are formed by different bacteria.

Blue (both bright blue and blue-black), yellow, red, orange, green, and violet are common colors developed by bacteria. Sometimes when bacteria develop more than one color, one may be soluble and the other insoluble, so that the culture medium may have one color and the bacteria growing on it may have an entirely different color. For instance, one organism may form a bright yellow growth on the surface of agar, but may color the agar itself a decided violet.

Bacteria, in growing, may or may not produce gases; some do, others do not. Those that do are called "aërogenic." The gases produced by the aërobic bacteria usually leave the surface of the culture medium unnoticed; but if the bacteria are anaërobic, and develop in the lower part of the medium, visible bubbles are formed about the colonies. We have read about the "gas-bacillus" which was so fatal during the early part of the war in Europe.

Some bacteria will produce acids, and some will produce alkalies, when growing in artificial media, and if either is present it is easily determined by growing the bacteria in milk in which litmus is dissolved. The alkali most frequently formed by bacterial growth is ammonium, which is set free from its combination and which either volatilizes as a gas or forms new combinations with acids.

Some bacteria do not have much effect on the culture medium, but there are other bacteria which, when grown in gelatin, cause the jelly to become partly or entirely liquefied. This liquefaction is sup-

posed to be a form of peptonizing. Some bacteria liquefy the gelatin in such a peculiar manner that the process becomes a valuable guide for their identification.

Sometimes bacteria produce peculiar odors which are of service in identifying the species.

Certain bacteria are able to reduce nitrogen compounds in the soil, or in culture media prepared for them, into ammonia. Others are able to take nitrogen from the air and combine it so as to be useful for the nourishment of vegetable life. The organisms which "reduce" nitrogen, so as to make it available in the soil as plant food, are known as "nitrifying" bacteria. Every farmer knows how impoverished-soil is improved by growing one or two crops of clover. The soil is fertilized by the bacteria on the roots of the clover.

Certain bacteria possess the power of digesting (peptonizing) the casein of milk.

This process varies with different bacteria, some digesting the casein without any change in the milk being apparent, while others produce coagulation. Some gelatinize the milk, and in still other cases the digestion is so complete as to transform the milk into a transparent, watery fluid. This coagulation and digestion of the milk is made of particular use to identify different bacteria. For instance, the colon bacillus coagulates milk, but the typhoid bacillus does not.

QUESTIONS.

1. What are bacteria?
2. How are bacteria measured?
3. How do bacteria reproduce?
4. Where are bacteria found in external nature?
5. Are bacteria ever present in normal or healthy tissues?
6. What are cocci? Bacilli? Spirilla?
7. What are spores?
8. What are flagella and what is their function?
9. Mention some of the functions of bacteria.
10. How does the number of disease-producing bacteria compare with the entire number of known species?
11. What are the principal factors in connection with the growth of bacteria?
12. What kind of food do nearly all bacteria require?
13. (a) What kind of food is indispensable to the growth of bacteria? (b) What effect has drying on bacteria?
14. What is meant by the following terms:
 - (a) Aërobic bacteria? Give example.
 - (b) Anaërobic bacteria? Give example.
 - (c) Optional or facultative aërobic bacteria? Give example.
15. What is meant by the following terms:
 - (a) Optimum temperature?
 - (b) Maximum temperature?
 - (c) Minimum temperature?
16. How does cold affect the growth of bacteria?

17. How does light affect bacteria?
18. What happens when different species of bacteria are grown together?
19. What are antiseptics? Give two examples.
20. What are germicides or disinfectants? Give two examples.
21. What is the simplest method of observing live bacteria?
22. (a) Explain the difficulties of studying living bacteria under the microscope. (b) How is this difficulty overcome?
23. What is meant by the term "culture media"?
24. Give the general requirements for artificial culture media.
25. Name and describe three liquid culture media.
26. Name and describe three solid culture media.
27. What are platinum loops?
28. How do cotton stoppers differ from cork or rubber stoppers?
29. What is an incubator? What is it used for?
30. Name two kinds of sterilizers.
31. Name three methods of sterilizing or disinfecting.
32. What is meant by the term "sterile" or "sterilized"?
33. What is a germicide? A disinfectant?
34. Name three methods of sterilizing by heat.
35. Name two methods of applying moist heat.
36. What is fractional sterilization, and why is it necessary?
37. What is pasteurization, and when and why is it used?
38. What is an autoclave, and what is it used for? Why?
39. Name five well-known chemical sterilizing agents.
40. Name three ways of sterilizing drinking water and tell why they are effective.
41. Name three methods of studying bacteria.
42. Name five facts concerning bacteria that we can discover by microscopical examination.
43. What is the meaning of the following words: Diplococci; streptococci; staphylococci?
44. What bacillus looks like a drumstick, and why?
45. What is the object of staining bacteria?
46. What is meant by "Gram-negative" and "Gram-positive"?
47. What do we call the bacteria which produce fermentation? Phosphorescence? Putrefaction?
48. What is meant by ptomaine poisoning?
49. Why are certain bacteria called aërogenic? Name an example.
50. What are "nitrifying" bacteria?

GUAM.

By H. W. ELLIOTT, Pharmacist, United States Navy.

As our country has been engaged in great activities for the past two years, very little has come before the eyes of the public about our island possession, Guam, and the goodly work that is being done here. Guam is the largest, most populous, and most southern in position of the Marianas Islands, a group which lies almost north and south along the one hundred and forty-fifth east meridian from Greenwich, and between the thirteenth and twentieth parallels of



ENTRANCE TO HARBOR, GUAM, M. I.



THE PORT OF ENTRY, GUAM, M. I.



NATIVE SAWMILL, GUAM, M. I.



A PALM-GIRT COVE, GUAM, M. I.

latitude, a distance of some 450 miles. The island of Guam is 20 miles in extreme length and averages about 6 miles in width. It lies almost north and south and is almost entirely surrounded by coral platforms and reefs. Its area is approximately 226 square miles. The distance from San Francisco is 5,044 miles, while from Manila it is only 1,506 miles. The southern part of the island is high and mountainous, while the northern half is one large plateau, ranging in elevation from 200 to 500 feet. The plateau consists almost entirely of some form of coral limestone, or "cascajo" (a soft coral of comparatively recent origin), with the cliffs at the seashore of hard madreporic rock. The climate of Guam is healthy and on the whole pleasant. The northeast trades prevail for six months of the year, during which time there is little rain. From June to the middle of December the monsoons blow and during this time there is an abundance of rain. The average and almost constant temperature is 81 F., but owing to the fact there is a constant breeze one may be comfortable when sheltered from the sun.

At intervals the island is visited by severe typhoons, which cause much loss of property and sometimes loss of life. The most recent typhoon occurred July 6, 1918, and destroyed all crops, fruits, and many wooden houses. The naval hospital was considerably damaged on this occasion, as one ward was partly unroofed while another was placed out of commission. However, the hospital was ready to meet all requirements and emergencies. As in the Philippines, earthquakes are of common occurrence, but they are not alarming. The shocks are usually so light, both as to force and duration, that they are rarely noticed, except when occurring at night without the noises and distractions incident to the day.

The island of Guam was discovered on March 6, 1521, by Hernando de Magallanes, then on his historic voyage around the world. Guam was under the Spanish rule until it was ceded to the United States in 1898. The native population to-day is approximately 14,000. The race is largely a mixture of Chamorrian, Spanish, and other European nationalities. The old "Chamorro" race, which was once predominant, is almost extinct now. Historians say that this race was considerably larger in proportion and stature than the race of to-day. The present inhabitants of the better class are exclusive, cultured, and refined. Their customs and mode of life are those of Europeans, and they stand ready to accept American ideas of society and social affairs. This class furnishes to the island officers, such as treasurer, island attorney, judges, clerks, and those filling minor positions. The middle and lower classes are a peaceful, good-natured, and law-abiding people, industrious in their own way and on their own work. The men dress in white drill or blue denim trousers, a shirt (with military collar) always worn with the tail on the outside

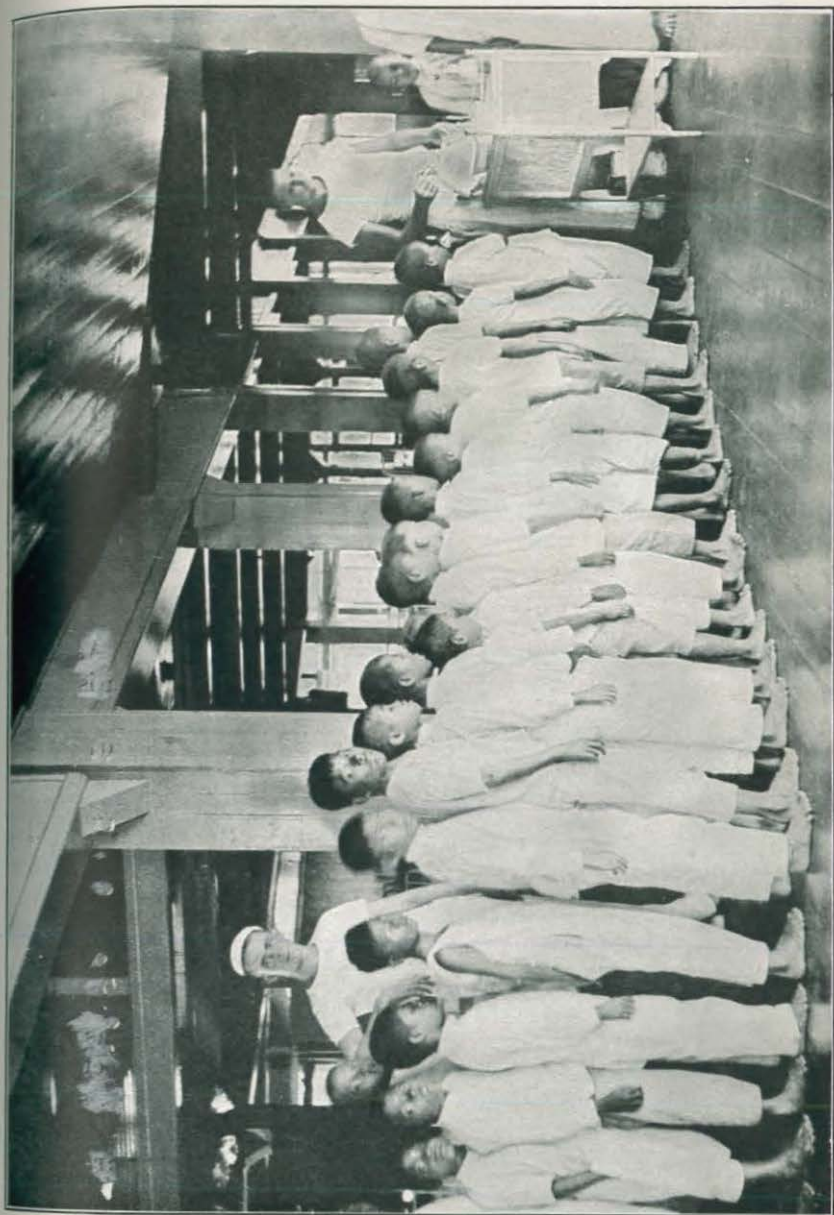
of the trousers, a straw hat, and half-slippers without stockings. Their wives and daughters usually wear a trailing skirt and a full low-necked, wide-sleeved blouse of piña cloth. The men are short of stature, but well-formed and strong in the legs. They can walk great distances in the sun and carry quite heavy burdens. The women are well formed, very erect in carriage, almost without exception have beautiful black hair, of which they take great care and are very proud. The main attractions on Sundays and holidays are cockfights and baseball games. The American national game has become a favorite with the natives, and they have become so expert that they are now hard to beat by other American teams on the island.

The government of the island of Guam, although different in constitution, is somewhat similar in form to ours. The chief executive is an officer of the Navy who holds the title of governor by appointment of the President, and is also commandant of the naval station. Agaña, the largest town of the island, has approximately 8,000 inhabitants. The United States Naval Hospital occupies a tract of land in the eastern part of the town. It consists of four buildings which are of the bungalow type, two-story structure with large and capacious porches. The Maria Schroeder Hospital, or Ward I, as it is commonly called, was named after the wife of the former governor, Captain Schroeder, United States Navy. It attends to the sick and injured of the supernumerary class. As there are no outside practitioners on the island, medical attention is given to all natives by naval medical officers who also take care of the enlisted personnel of the Navy and Marine Corps. The natives are classed as supernumeraries, and all male supernumeraries are cared for in Ward I. At regular intervals all school children are examined for intestinal parasites.

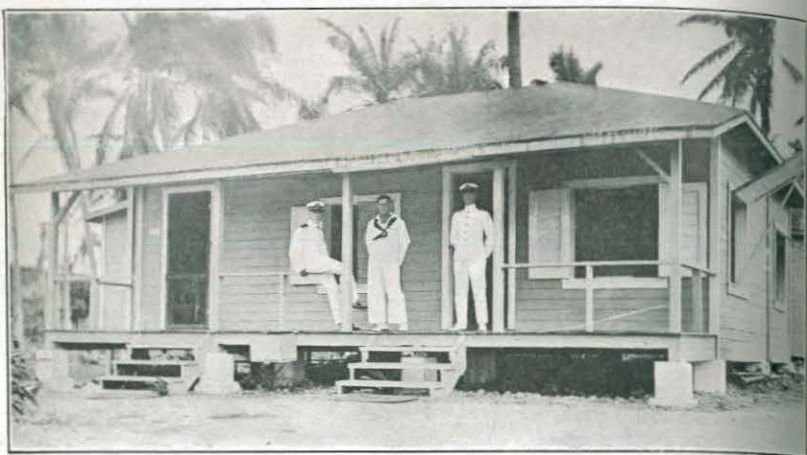
The male children are admitted to the hospital, Ward I, and given treatment, and are not discharged until a microscopical test gives a negative result. This ward has ample room, allowing 6 feet between centers of beds, to accommodate 36 beds. In an emergency the porch space could be utilized. The most common of the intestinal parasites is the hookworm. It is evenly distributed both as to sex and age, about 70 per cent of the native population being infected.

In Ward I treatments for hookworm and other parasites such as *ascaris lumbricoides*, *trichuris trichiura*, and *strongyloides stercoralis*, are daily administered. Ward I has an ifil (native hardwood) or mahogany floor and when polished acquires a wonderful luster. The ward is inclosed with screen wire, thereby affording plenty of fresh air as well as keeping out flies and mosquitoes.

A dressing room is well fitted out in this ward and most of the minor surgery and first-aid cases among the natives are taken care



YOUTHFUL VICTIMS OF HOOKWORM RECEIVING GOVERNMENT CARE.



MEDICAL OFFICER'S QUARTERS AND DRESSING STATION AT SUMAY, M. I.



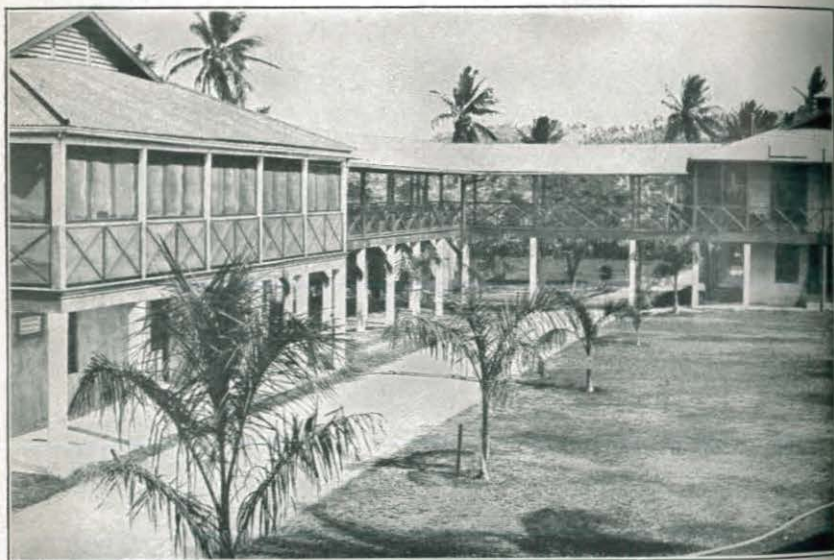
NATIVE NURSES.



THE BEAUTIFUL HIGHWAYS OF GUAM, M. I.



A CAMP IN THE HILLS.



THE SUSANA HOSPITAL, GUAM, M. I.

of here. A medical officer is in charge and three hospital corpsmen are detailed to this ward.

Ward II is for the enlisted personnel of the Navy and Marine Corps, which numbers approximately 600, 100 of which is Navy, enlisted. The bed capacity, allowing 6 feet between centers of beds, is 30. In an emergency 30 more beds could be set up on the porches which surround this ward. This ward is also screened with copper wire, allowing plenty of fresh air, and insuring absence of flies and mosquitoes. The ceiling is high, thus affording at all times plenty of air space. All injuries and diseases that are not infectious among the enlisted personnel are treated in this ward. Great care is exercised in treating all *cascajo* and other abrasions of the skin to prevent tetanus. A hospital corpsman detailed here has a better opportunity to apply his theory to practice than in larger hospitals as surgical and other varied cases comes under those detailed in Ward II. A medical officer in charge and three hospital corpsmen are detailed to this ward.

Ward III is for the native females of the island, who are carried on the hospital records as supernumeraries. The bed capacity is the same as that of Ward II. It occupies the top floor space, same as the other wards. It is well screened, has a high ceiling and an *ipl* deck. The female natives are treated here for intestinal parasites and the female school children are seen and treated at regular intervals. As the birth rate has steadily increased within the past several years, obstetrical cases have given a larger margin for the work carried on in Ward III. A medical officer, Navy nurse, and native nurses are detailed to care for the sick and injured in this ward.

The Susana Hospital, founded by the Susana Hospital Association through private subscription, is named after Mrs. Susana Dyer, and is largely supported by Mrs. Russel Sage, of New York City. It consists of one large ward, divided and subdivided into four rooms for women and children and for the officers of the island. The bed capacity is 8, while in an emergency 12 more beds could be placed on the porches. The work done here is similar to that done in Ward III, with the exception of caring for officers. There is also a gynecological ward and a special diet kitchen erected in close proximity.

A medical officer, a Navy nurse, and such native nurses as are needed are detailed here.

The commissary department is under the supervisory charge of the Pharmacist with one chief pharmacist's mate to execute all orders pertaining to the running of this department to the satisfaction of the commanding officer. The floor of the galley is of cement as well as that of the store room. The place is well piped, affording plenty of water to keep the place rid of the accumulation of filth and rubbish, and is well ventilated.

The mess hall accommodates, with little crowding, 31 hospital corpsmen, which is the complement of this hospital. The monthly transports bring from the United States meats, fresh vegetables and other provisions, which are kept in store for daily issue. Fresh vegetables and fruits are obtainable on the island when in season.

The medical store room is in charge of a chief pharmacist's mate, under the supervision of the executive surgeon. Medical supplies and other materials are listed and arranged in accordance with the supply table, so that they may be readily and easily found by one other than those detailed here. The hospital being the only source whereby medicines are obtainable for the sick of the island population, a large stock of medicines is kept on hand.

As boats are irregular and transportation to Guam uncertain, a requisition for urgent supplies may be forwarded to Canacao, P. I., by radiogram.

A medical officer is in charge of the laboratory and a chief pharmacist's mate is detailed here. Owing to the many island infections and diseases this is an important and interesting duty for hospital corpsmen.

The following entries show the work done in the laboratory for the year ending December 31, 1919:

Total number of stool examinations	1632
Total number of urine examinations	547
Total number of liquor examinations	56
Total number of samples of anisetta analyzed	37
Total number of samples of gin analyzed	5
Total number of samples of wine analyzed	4
Total number of samples of beer analyzed	2
Total number of T. B. slides examined	105
Total number of G. C. slides examined	1374
Total number of blood examinations	124
Total number of stomach contents examined	12

Island diseases.—Cases of gangosa, which is one of the principal diseases of the island and one with which not many hospital corpsmen are familiar, are examined and treated at the clinic and different out-stations. For those not familiar with the disease a short description of the disease follows. Gangosa, which has been regarded by some as a sequel of yaws, generally commences as an ulcer on the soft palate. Slowly spreading it may make a clean sweep of the hard palate, of the soft parts, cartilages and bones of the nose, sparing the upper lip, which is left as a bridge across a great chasm, the floor of which is formed by the intact tongue. It may occur at any age from childhood to 80. The lesion has been attributed to leprosy, tuberculosis, syphilis and yaws, but it is of a different nature from any of these. Salvarsan, or neo-salvarsan, has a rapid and remarkable curative effect. On out-stations, where the same measures



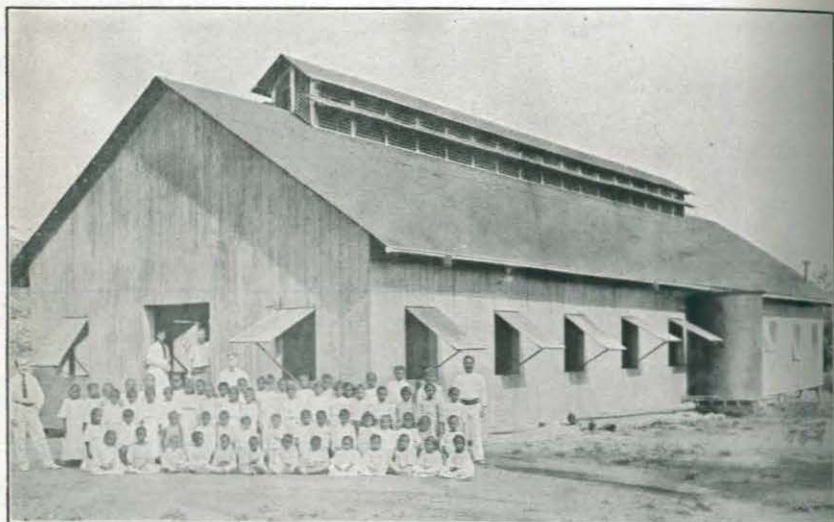
A PALM-GROVE TOWN.



VICTIMS OF GANGOSA AT THE CLINIC, GUAM, M. I.



AN OUT-PATIENT STATION OF THE MEDICAL DEPARTMENT, GUAM, M. I.



COUNTRY SCHOOL, GUAM, M. I.

can not be resorted to as at a hospital, nitrate of mercury ointment and iodoform ointment are used externally. Mercury or potassium iodide is employed internally. On December 31, last year, there were 247 gangosa patients listed on the island.

There are 12 dressing stations throughout the island. Hospital corpsmen are ordinarily detailed at seven of these stations. At present there are three vacancies, owing to the lack of hospital corpsmen.

At the five remaining stations, first aid is administered by the native school teachers. Hospital corpsmen on duty at these stations are required to minister to the sick, make sanitary inspections, see that sanitary regulations are carried out, and submit written reports to the health officer twice a month, or oftener if necessary. Two out-stations, which are located on the southern end of the island, are difficult to reach. The available transportation is generally by boat and requires some time. The hospital corpsmen detailed at these two places are often called upon to assume responsible duties, as time and transportation would not permit a serious case to be sent in to the hospital. At such critical moments a hospital corpsman is called upon to use his own best judgment in all matters that concern the preservation of life.

THINGS AS THEY ARE.

MOLECULES, IONS, ATOMS, ELECTRONS.

By CHARLES W. CUNO, Ph. D., Yankton College, South Dakota.

In order to understand the present-day development of the periodic table it is necessary to have first a thorough understanding of the relationship of molecule, ion, atom, and electron. Unfortunately many texts use the words molecule and atom loosely, so that a confusion arises in the mind of the student.

Of the four terms, molecule is the largest and the most inclusive term. Molecules may be divided into ions, as in the case of a solution of ammonium sulphate in water. Ammonium sulphate is taken as an illustration, because in this case both the ions ammonium, NH_4 , and sulphate, SO_4 , are not elements but semimolecules capable of further subdivision. In turn, both ions and molecules may be momentarily changed into atoms, and lastly electrons may be entirely separated from molecules, as in radium, and the radioactive elements causing the degeneration of the atom itself and the formation of other elements therefrom.

We recognize two molecular conditions, the molecule of a compound and the molecule of an element. The stock definition of a molecule is: A molecule is considered the smallest particle into which a substance may be divided without that substance losing its identity.

In its strictest interpretation this is not true, as both compounds and elements may be ionized without losing their identities, and the elements are identical whether molecular or atomic.

Both compounds and elements are in the molecular condition ordinarily. The ionic and atomic conditions are only momentary, or at least constantly changing from the ionic and atomic to the molecular and back again.

Certain substances when in solution (usually in water) are said to ionize. These substances are very active chemically and are good conductors of electricity. Substances that are said not to ionize are, on the other hand, practically nonconductors of electricity and almost inactive chemically. To explain these things the ionization theory supposes that these molecules in solution separate into ions; that the ammonium sulphate separates into two ions of ammonium and one of sulphate; and, further, that the ammonium ions carry positive charges of electricity, and that the sulphate ion, being bivalent, carries two negative charges; and, further, that the two negative charges on the sulphate ion are in reality electrons in excess of the actual atom and, by inference, that the ammonium ions are positively charged, because in reality they lack one electron each. It may be readily seen that when these negatively charged ions reach the positively charged plate of a battery these excess electrons escape and the substance becomes first atomic and then molecular. This is more readily seen in the decomposition of sodium chloride by the electric current. When the chlorine atom touches the positively charged pole it is relieved of its excess electron and becomes for the instant atomic chlorine. If the substance of which the pole of the battery is made is zinc or any substance readily attacked by atomic chlorine, a chloride is immediately formed. If, however, the pole is platinum, which is not attacked by chlorine, the atomic chlorine immediately combines with itself, making Cl_2 , molecular chlorine.

The peculiarities of ionization are these: That substances do not ionize completely, and that in a given solution there is constantly a change from ion to molecule and vice versa; that substances ionize more completely in dilute than saturated solutions; that only substances that ionize are chemically active; that in order to afford passage for the electric current a substance must ionize; that substances do not necessarily ionize into their elements; that ions are not chemically active, but that their charges must be neutralized first when they are considered as becoming atomic.

We have touched upon the atomic condition in our discussion of the ionic condition. The atomic condition is a very transitory, we might say almost imaginary, condition. At very high temperatures (vide the atmosphere of the sun) all elements are supposed to be in the atomic condition. We have seen how elements become

atomic in solution. Heat as in combustion, sunlight as in the photographic plate, electricity as in the fixation of nitrogen, and even shock as in the explosion of nitroglycerin, may produce the atomic condition and thereby chemical action.

The electron has been defined as the atom of negative electricity. It was first isolated and scientifically investigated in connection with its manifestation in the disintegration of radium. It has been estimated to have a mass one eighteen-hundredth that of an atom of hydrogen, the lightest of elements, and the amount of electricity it carries has been accurately measured. In fact, we have more actual knowledge about the electron than about the molecule or the atom. Its almost negligible mass, compared with its large energy charge of electricity, has led certain writers to consider it the unit of energy. Our knowledge of the electron has led us to theories about the structure of the atom. The more universally accepted of these is that the atom is composed of a positive nucleus surrounded by concentric rings of negative electrons.

According to the electron theory, a neutral atom consists of a positively charged nucleus and a negative electron or electrons, the total positive charge being equal to that of the negative charges on the electrons. It is possible in various ways to attach one or more electrons to such an atom; it then becomes negatively charged. It is also possible to detach one or more electrons; the remainder is therefore positively charged. In either case it no longer is an atom but becomes an ion. A univalent atom, like hydrogen, is one which can receive or give up one electron and no more. A divalent atom can receive or give up two electrons, and so on.

Our discussion leads to the following summary:

Molecules are the usual stable or semistable condition of matter. Conversely when a substance displays activity its molecular structure is in some way disturbed or unsatisfied.

Ionic conditions are usually thought of as occurring only in solutions. This is not strictly true. They are recognized by the activity of the substance, its conductivity of electricity. Ionization probably precedes all chemical action.

The atomic condition of an element is a momentary or transitory state. Exceptions to this are the inert gases, helium, krypton, niton, etc., which are considered both atomic and molecular. The atomic condition is a very active condition. Elements are probably in the atomic condition at very high temperatures.

The electron is a definite portion of all atoms. It has the same characteristics and identical electric charge, no matter from what element it is obtained. It is the first link of similarity between the different elements and leads to various hypotheses as to the constitution of matter and the ultimate source of energy.

WITH THE GENDARMERIE D'HAITI.

By L. B. FINLEY, Chief Pharmacist's Mate, United States Navy.

It is the writer's intent to describe briefly in this article the organization, distribution, duties, and something of the life of the Hospital Corps personnel of the Gendarmerie d'Haiti, for the purpose of giving hospital corpsmen in other parts of the world an idea of the work in which several of their old shipmates are engaged in Haiti.

The medical corps of the Gendarmerie is limited to three commissioned officers of the Navy medical corps and nine enlisted men of the naval hospital corps. This personnel is commissioned by the Haitien Government as follows: One medical director with rank of colonel, two medical inspectors with rank of major, three lieutenants, and six second lieutenants. Besides the commissioned grades, several contract surgeons are employed. These native physicians receive the pay and wear the uniform of second lieutenants.

The three lieutenants are chief pharmacist's mates in the Navy, as is also one of the second lieutenants. The other second lieutenants are first and second class pharmacist's mates in the Navy. All draw the pay of corresponding grades in the line of the Gendarmerie, though not having the same chance of promotion to the higher grades. This is due to an agreement, fixing the number and rank of the hospital corpsmen who were to be detailed for duty with the Gendarmerie. At the time this agreement was made it was considered a great concession to give even the rank of lieutenant to members of the naval hospital corps.

The medical director, whose office is at headquarters, has charge of the medical corps, which is distributed with a view to obtaining maximum efficiency with a relatively small force. One medical inspector is detailed to the Department of the Cape, with headquarters at Cape Haitien, a seaport town about 150 miles north of Port-au-Prince. This inspector has in his department one lieutenant, two second lieutenants, and three contract surgeons. These officers are detailed in various inland and seaport cities. The Department of Aux Cayes, with headquarters at Aux Cayes, has one medical inspector, two second lieutenants, and four contract surgeons. In the Department of Port-au-Prince there are, besides the medical director, two lieutenants, and two second lieutenants. In this department there is only one outlying post where a medical lieutenant is stationed, that being Lascachobas, a town about 50 miles inland. All the other outlying towns and detached posts about Port-au-Prince are easily reached in a few hours by train, automobile, boat, or horse, which permits keeping an additional medical officer at headquarters.

The duties of medical officers are varied and, in the main, interesting, although at times rather discouraging because of slackness on the part of gendarmes or others who sometimes fail to present themselves for treatment until their diseases are discovered at the weekly inspection, thereby necessitating additional time and trouble in the treatment.

Each medical lieutenant is charged with the treatment of the sick, sanitation of Gendarmerie quarters, and care of all medical property in his assigned district. A district is made up of several towns and scattered hamlets, each one of which may be a day's ride from the district headquarters. The district medical officer has to interest himself in the physical welfare of the inhabitants, treat emergency cases, and, in towns where no native physicians are located, to keep open a dispensary for the benefit of the poor. Supplies for the latter purpose are not furnished by the Gendarmerie directly, but are obtained on special requisition through the brigade commander. When stationed in coast towns the medical lieutenant is detailed as assistant quarantine officer and must carefully note, and correct if possible, all infractions of the law in regard to strict surveillance of incoming and outgoing craft. Besides the duties already enumerated, medical officers have the care of sick and physically incapacitated prisoners in their respective districts, which involves a routine of daily sick call in the principal prisons and monthly inspections of all working gangs of prisoners in different parts of the districts.

An outline of the duties of three or four medical lieutenants will serve to show the diversity of duties performed here by American hospital corpsmen.

At Port-au-Prince one medical lieutenant, an expert laboratory man, is detailed as medical officer of the Caserne Hospital, an institution of the medical department which serves some 500 gendarmes, as well as American officers and their families. This hospital is equipped with a small operating room, dressing room, dispensary and office, laboratory, and ward. Besides the usual ward cases, there is a large number of ambulant cases to be looked over and treated every day, and also a good deal of laboratory work.

Syphilis and other venereal infections, intestinal parasites, tuberculosis, and malaria are the diseases that largely occupy the time and attention of the medical officer stationed at the Caserne Hospital. Naturally the medical director gives a great deal of his time to this hospital, but the greater part of the work devolves, of course, upon the medical lieutenant, who has in every way measured up to the responsibilities of his position. Daily classes in the rudiments of Hospital Corps work require the additional services of one other French and Creole speaking medical officer and a native clerk from

the medical director's office. These classes fill about six hours a week.

Of the two other medical lieutenants stationed in Port-au-Prince one has duty at the city penitentiary, an institution harboring some four or five hundred criminals and vagabonds, and the other is stationed at headquarters, with outside duty of sanitary inspections, etc., when called upon.

The prison detail is a work of importance since the prisoners, coming as they do from the lower walks of Haitian life, are nearly all diseased and have no resistance to acute infections. Some 70 per cent of inmates examined were found to be syphilitics, and a large proportion of the whole have mixed infections, such as syphilis, tuberculosis, and hookworm. At least 20 unfortunates drag themselves to the prison infirmary daily for treatment, and there are usually three or four besides who are unable to move from the infirmary beds. By and large it is a disheartening task properly to care for the prison sick, inasmuch as lack of funds to purchase suitable food, together with the patients' apathetic frame of mind, makes cures hard to accomplish.

The work of medical lieutenants on independent duty at outposts is in general very interesting and productive of increased professional ability. Several of the lieutenants have performed amputations and other operations with only a limited equipment of instruments and dressings at hand, and it is an ordinary occurrence to be called in the dead of night to mount a horse and journey miles over mountain trails in order to render medical assistance to a sick or injured gendarme.

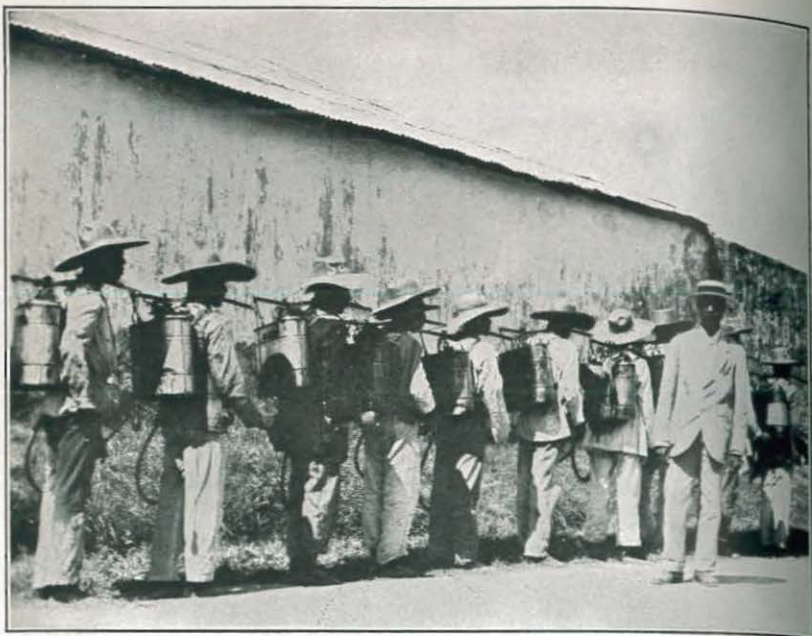
One of the unpleasant features of this outpost duty is the lack of habitable dwelling houses in the smaller towns of the districts, and another is the lack of social diversion.

As for home life, some of the medical lieutenants live in general messes composed of from two to eight gendarmerie officers, others are married and have, of course, their own houses, and one has overcome the want of suitable quarters in his town by the simple expedient of building his own house, which, by the way, is the best residence of that village. On account of bad roads and long mountain trails, very little visiting between medical lieutenants has in the past been practicable; therefore, hardly any two of them are conversant with each other's duty and problems. However, now that good roads uniting all parts of the island are rapidly nearing completion, one may, by means of automobile transport, pass the week end at almost any remote post, returning to Port-au-Prince or other starting point in time to resume duty on Monday morning.

One of the greatest advantages of these new roads lies in the speedy transportation of medical supplies to interior posts by auto and



MULE CARTS USED FOR GARBAGE DISPOSAL.



A GANG OF PRISONERS STARTING OUT TO SPRAY MARSHES AND POOLS FOR EXTERMINATION OF MOSQUITOES.



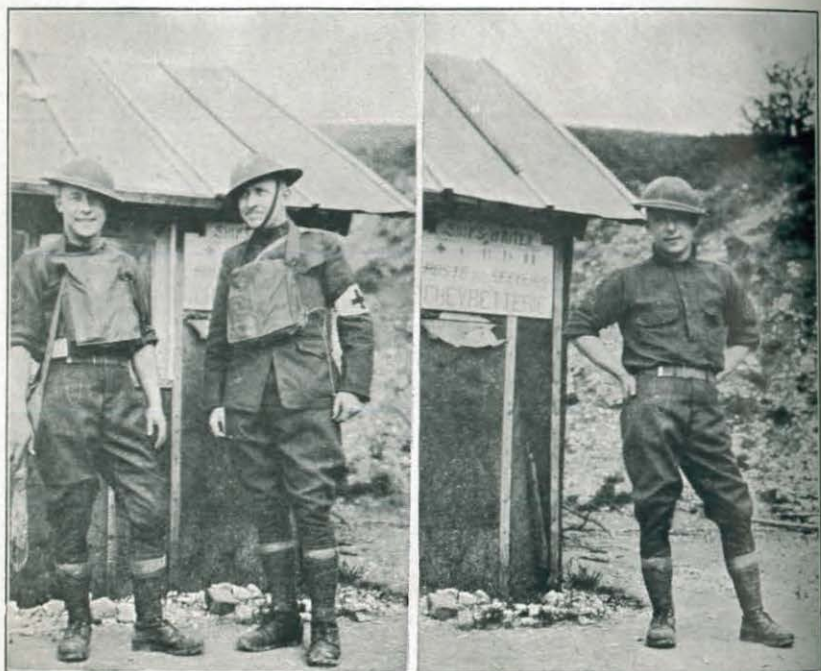
AN ASSEMBLAGE OF NATIVE EMPLOYEES.



1. A GROUP OF HOSPITAL CORPSMEN ENJOYING A RARE MOMENT OF LEISURE.
2. MEDICAL DETACHMENT, 3D BATTALION, 6TH REGIMENT, U. S. M. C.



READY FOR ANY DUTY WHERE COURAGE AND SKILL ARE NEEDED.



HOSPITAL CORPSMEN WHOSE FINE SERVICE BROUGHT THEM RECOGNITION.

pack train. Where formerly the medical officer had to wait weeks and sometimes months for stores, they now receive them within a week or 10 days.

Taking everything into consideration, the new duty demanded of hospital corpsmen in this island is pleasant, remunerative, and profitable in a great many respects.

NAVAL HOSPITAL CORPSMEN IN ACTION WITH MARINES.

By JOEL T. BOONE, Lieutenant Commander, Medical Corps, United States Navy.

The naval hospital corpsmen attached to the Fourth Brigade of Marines in the Great War have played a most glorious part in the world-heralded achievements of that small but renowned unit The Marines; and they have once more added laurels to their already notable accomplishments.

Too few within and without the service know or appreciate the official status of the medical enlisted personnel attached to the Marine Corps whenever that branch of our service is operating away from the Navy proper. There has not been a campaign conducted wholly or in part by the Marines that Navy hospital corpsmen have not been attached to represent the naval medical corps, independently or in association with naval medical officers. Whenever or wherever the deeds of the Marines are related, whenever that martial marine song is sung, it should be remembered that in all these thrilling achievements the Navy hospital corpsmen have taken a very active, a very honorable, a very praiseworthy part. We have failed possibly because of our ignorance in the past to properly honor these brave lads. We may, perhaps, have considered their accomplishments nothing more than the performance of duty in the ordinary sense, and belittled their individual heroic deeds. If we have, we have erred; we have not paid honor to whom honor is due. As civilians, as officers, or brother enlisted men let us henceforth bow our heads reverently to the memory of those hospital corpsmen who have served their country so honorably in the campaigns and expeditions of the past and who are no longer here to receive just and deserved homage. And let us rightly ever honor those who are still on earth among us.

Many, many notable deeds of heroism have been performed by the Navy hospital corpsmen in Mexico, China, the Philippines, Samoa, Guam, Cuba, Nicaragua, Haiti, Santo Domingo, Panama, and elsewhere; but never have there been more notable displays of heroism, greater deeds of valor, or more courageous acts under the most gruesome tests than on the battle fields of France. Would that I could relate every individual brave, exemplary act of the hospital

corpsman who has been privileged to serve with the Marine brigade as part of the American Expeditionary Forces in France. Many hospital corpsmen have been awarded decorations for valor by the American Government; a few have received both American and French awards. The courageous exploits of many will never be known, for they have been unseen and unheard. The hospital corpsman is wont to "carry on" modestly and without vainglory. Then there are those who, while performing possibly some of the most heroic deeds of the war, have paid the supreme sacrifice, offering their young lives while in the act of succoring fallen comrades. Those who have thus given their lives on the field of honor are deserving of the greatest honors within the power of our Government to bestow.

The departure of the Fifth Regiment, United States Marine Corps, for France late in May, 1917, with the first convoy of troops for service overseas, as the vanguard of that great American army to follow later, meant that Navy hospital corpsmen had once more sailed from their home shores to add another chapter to their record of brave deeds. In September the First Battalion of the Sixth Regiment, United States Marine Corps, sailed. It was not until February, 1918, that all elements of the Sixth Regiment and the Sixth Machine Gun Battalion (the only marine machine-gun battalion attached to the brigade) were landed and brigaded as the Fourth Brigade of the Second American Division (Regular). The work of the hospital corpsmen prior to this date was chiefly with their various units, either in training areas or at base ports and along the lines of communication. Their duties were those incident to the health and comfort of the marine personnel, embracing personal and camp hygiene and sanitation. Small detachments of marines were assigned various duties as military police in a number of cities and towns; as engineers at camps, reservoirs, docks; as labor parties for unloading transports and merchant ships, etc. Because the marine is a versatile individual he was assigned sundry duties in those days of organization and was always found competent, whether the task proved pleasant or unpleasant.

Wherever marines were assigned at least one hospital corpsman was to be found with or without commissioned medical personnel. His first thought was the care of the health of those associated with him. He not only treated them when sick, but he took all the necessary precautions to prevent illness and did what he could to protect them against the damaging effects of disease. Wherever he was he performed his routine and other duties in a most creditable manner, frequently displaying noteworthy ingenuity and originality in handling the problems falling to the medical department. When on independent duty, the hospital corpsman is familiarly and affectionately

known as "Doc" by the enlisted men. It is surprising how much confidence is placed in their knowledge and in their professional opinion by the men in their respective units. Because the enlisted man confides in them and respects their advice, hospital corpsmen soon acquire the characteristics typical of the medical profession, in ascertaining what is best for mankind incident to health and what are the factors that tend towards or produce disease. They think, read, like to talk about these things to the men. It is not long after a hospital corpsman joins a unit until his opinions are sought and his advice followed. The men have confidence in him and trust him and rely on him to help them and to take care of them. This is why changes in hospital corpsmen from one unit to another are invariably met with protest by officers and men; and it is why the marine, when put to the greatest test of human endurance, when every spark of his mental and physical being was called upon, wanted the assurance beforehand that "Doc" would be there.

After the brigading of the marines in a training area in the Vosges, very strenuous activities were carried out to prepare them for occupation of a trench sector, at first in small detachments with the French, later as regimental and brigade units. Much of the training was along lines essential for participation in a highly specialized form of warfare. While the tactics and drills practised were especially for carrying on stationary or trench warfare, the possibility that the character of warfare might at any time be changed by force of circumstances to one of movement or open warfare, made it necessary for the training to include the acquisition by officers and men of both methods. Regimental, brigade, and divisional maneuvers were conducted in the open country under all kinds of inclement weather, particularly characterized by "the rain, the cold, and the mud; the mud, the cold, and the rain." Practice trenches were occupied by successive battalions for 24-hour periods. The weather during this particular stage of training must have simulated what we read and picture as having existed at Valley Forge when our forefathers were, like us, enduring hardships, suffering privations, for the happiness and freedom of mankind—theirs the beginning, ours, let us hope, the culmination. The hospital corpsman always accompanied the infantryman. He must live and work, not always at the same occupation, but with the man of the line. Perhaps in former campaigns he was at times excused from practice marches, drills, maneuvers, etc., but not so in this one. He must know his men—one of the principal reasons why the best results are obtained by permanent detail of hospital corpsmen to companies and battalions; he must know them as well on the "hike" as in the barracks; he must familiarize himself with their idiosyncrasies; he must know the weak and the strong, the dauntless and the faint-

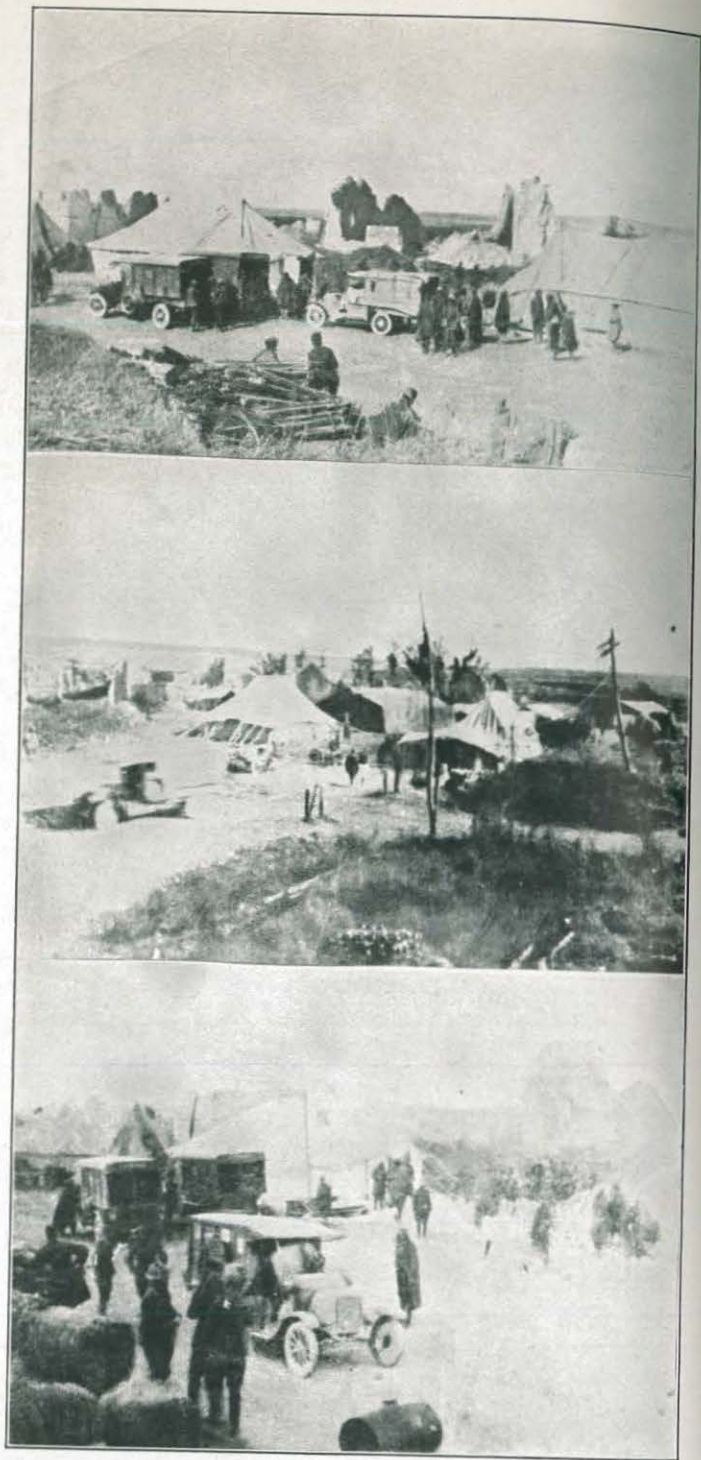
hearted; the overzealous and the tenderfooted. He must build up his body so that it can withstand all kinds of hardships, so that it will know no fatigue within the bounds of human endurance. He must develop, or possess, an always cheerful, happy, kindly manner, a readiness to help, even though tired, hungry, cold, and worn. His work is not finished at the end of the day when the drill or the practice march is completed, for then there are feet to inspect, blisters to dress, ankles to strap, muscles to rub, medicines to distribute, the physically unfit to tell the doctor about.

Sometimes there are those who must be cheered up, encouraged. He talks to these, slaps them on the back and bucks them up, when his own body aches from head to foot and his head swims. His days are scheduled just the same as the man in the line, and his reveillé is at the same hour as the others, though taps for him frequently is very much later than for "his men." It takes a stout heart, a strong, clean body and a clear mind to be a hospital corpsman in the field, but the Navy hospital corpsman during those two months of intensive training never faltered and performed his strenuous duties with an ever-present willingness, and cheerfulness, an abiding consciousness of the high regard he held for his profession, and a high appreciation of his obligations.

About the middle of March the Second Division was ordered to trench sectors southeast of Verdun for instruction under French troops. The Medical Department worked with the French for a time, learning a great deal. Later each regimental medical organization worked alone in its respective sector, learning much through force of circumstances. The Hospital Corps here particularly distinguished itself, for two of its members were awarded distinguished service crosses, one of them, alas, posthumously. A company of the Sixth Regiment was badly gassed by a gas-shell bombardment in the early morning hours of April 13, while in a reserve position in wooden shacks in a wooded ravine. Merely to show the seriousness of this shelling, it is well to state that out of a company of 250 men, about 235 were evacuated as sufficiently gassed for hospitalization, 11 per cent of whom died within 72 hours. The two hospital corpsmen (names are purposely avoided in this article since the names of all who have done meritorious and heroic acts are not known) attached to this particular company showed no early symptoms of poisoning and assured the medical officer, handling the evacuations, that they were unaffected. They labored most heroically assisting in the evacuations and in doing everything in their power to assuage the pain and to comfort "their men" while awaiting transportation. They both ignored the prodromal symptoms in order that they might help those who seemed in most need of their aid. They carried on until forced by the medical officer to cease their labors, when their



GROUPS OF HOSPITAL CORPSMEN.



AMBULANCES BRINGING IN THE WOUNDED.

poisoning was first noted by him. One of these brave lads sacrificed his life in an effort to care for "his men"; the other lad incapacitated himself for any further service and has never been able to rejoin his organization. This was but the first of self-sacrificing service involving death, performed by members of the Navy hospital corps on French soil. It was with this same spirit that others in later battles made the supreme sacrifice.

While in the trench sector the advisability of having two men detailed definitely to a company, when only the Army allowance was available, proved to be most advantageous. Of course, when there was an excess of hospital corpsmen, five men to a company gave even better results. It was possible then to assign one man to each platoon, with a pharmacist's mate, first or second class, as personally responsible for both the company and the hospital corpsmen assigned thereto. This was the ideal arrangement, for it developed the hospital corpsman in charge to assuming responsibility; trained him in handling men; impressed upon him the importance of an authoritative position, even to a comparatively slight extent and because of this experience, splendid battalion chief pharmacist's mates were developed. The platoon hospital corpsman, when demonstrating the qualities necessary to assume the duties of a company senior hospital corpsman, was assigned to the latter position and upon "making good," he was promoted. It should be stated that practically all hospital corpsmen held the rate of hospital apprentice first class or pharmacist's mate, third class, prior to arrival in France. A man acting as company senior hospital corpsman held the rate of pharmacist's mate-1c, or pharmacist's mate-2c. These men were responsible to the battalion chief pharmacist's mate, who, in turn, was responsible directly to the battalion surgeon. This delegation of authority and responsibility under the battalion surgeon was most advantageous to the regimental and battalion surgeons, the hospital corpsmen, and the line personnel. There was a more or less variable number of hospital corpsmen with battalion headquarters. At regimental headquarters there were usually six or eight hospital corpsmen, with the regimental machine company two, and one with headquarters company, all under the regimental pharmacist's mate. To him also were the battalion chief pharmacist's mates responsible.

The accompanying scheme shows the ideal regimental organization, but the Army allowance is 48 hospital corpsmen; however, the marine units frequently had sufficient enlisted personnel to carry out this organization plan:

- Regimental headquarters, 4 to 6 hospital corpsmen.
- Each battalion headquarters, 3 to 4 hospital corpsmen.
- Each company, 2 to 6 hospital corpsmen.
- Each platoon, 0 to 1 hospital corpsman.

In the trench sector the hospital corpsmen man aid stations or *postes de secours*, a name we almost universally adopted from the French, which were situated in specially built dugouts or in the side of a hill facing away from the enemy, or were located in cellars of partially or totally destroyed houses, or in remnants of rooms, etc. Aid stations in stationary warfare must be selected with a view to affording a certain amount of warmth for wintertime and frequently facilities for caring for patients for a number of hours prior to evacuation. These aid stations are rarely moved except in an extensive change of position. They are abodes for the medical personnel covering the various areas, as well as sick and wounded quarters. The brigade carried the familiar Navy nomenclature with it. The sick bay, the galley, on deck, standing watch, gangway, port and starboard, going ashore, and many other terms and expressions were heard through the sector held by the Marine Brigade, much to the amusement of our divisional comrades and other Army units. This nomenclature soon became characteristic of the Second Division after closer association of all divisional elements in the succeeding months. One marine regimental medical department stenciled signs which were hung up over the indicated quarters of officers bearing the designations the skipper (the regimental surgeon), executive (regimental surgeon's assistant), ship's writer, galley, crew's quarters, sick bay, etc. These signs were carefully placed and carried away from the trench sector, but how ignorant were all hands of the new warfare to be encountered, of how crude were to be their quarters, how extensive were to be their travels from sector to sector, with but a few days in one place and with little semblance of permanence.

Looking back upon it the trench life, though at the time it seemed fraught with the greatest privations and hardships, was a luxurious rest area in comparison with the blood-stained battle field of open warfare. Bathing was possible, if not always while one's unit was actually in the front lines, when back in reserve positions, for there flowing water was to be found, usually piped, at least flowing in clear streams. Hot, cooked meals were indulged in three times a day. Canteens were accessible for buying those little extras which do not let the soldier forget the still existing possibilities of satisfying his desires when on the "outside." We are all much indebted to the associated services—the Red Cross, the Y. M. C. A., the Knights of Columbus, etc.—for the comfort they brought to the combatant troops through the medium of other than the actual necessities of life. They have done much more; they have brought messages from home through the little gratuitous packages sent from "over there." The kindness and love in each package cheered the soldier because he recognized in it a caress from some loved one when a little display of affection meant so much to him.



THE PHARMACIST'S DEPARTURE WAS A SAD DAY FOR THE REGIMENT. HE HAD HAD MANY HITCHES IN THE NAVY; HE HAD THE SAILORMAN'S ROLL, THE SAILORMAN'S MANNER AND FIGURE OF SPEECH; HIS WITTICISMS CHEERED WHEN THINGS SEEMED GLOOMY.

Supplement to Naval Medical Bulletin, October, 1919.



SLEEPING SHELVES AND MEN'S KITS READY FOR INSPECTION IN ADRIAN BARRACKS.

But this is a digression. In the trench, if there was any water at all available other than that in the little canteen the old-time marine bathed. He not only cared for the cleanliness of his own body but, by example and persuasion, he saw to it that the younger marines did likewise. The hospital corpsman, even though a recruit prior to sailing, had been impressed with the importance of personal hygiene and he took every opportunity of bathing himself. While making a tour of inspection of the forward aid stations in the Verdun sector the front-line trench had to be traversed at a point where the trench had been dug behind an old railroad embankment, thus giving it an added protection. There was a small stream flowing out into no man's land. A hospital corpsman attached to the company then holding the front-line position was stripped and lathered from head to foot. It was an overcast day with neither balloon nor aeroplane to spot his shining nakedness and bring a strafing to that area. It was unnecessary to ask how things were going "up here." His radiance answered many questions and delivered a message relative to the high morale of our boys up forward when the day's happenings were to be discussed in the colonel's mess that evening. This incident did not occur on a warm summer's day, but in the early spring when a sweater under one's coat or shirt was most comfortable. The men never failed to keep shaved. At times one marveled knowing the stations of some and the absence of water save the daily canteen ration, how the men accomplished their toilets. The marine and the bluejacket have a way of doing things in the field without anything to do it with, as we are wont to say. Through necessity they may be dressed in ragged, vermin-infested clothing and share both their abodes and their mess kit with the sociable, indiscriminating trench rat, yet they will shave and perform local or general ablutions whenever possible, and they usually make it possible. The old marine was incomparable, in every sense of the word, as a soldier. Those hospital corpsmen privileged to serve with him were destined to be the better by his experience. It was well, in those days, that we did not know that the old marines' days were numbered and that the first two engagements were to remove many of the most typical of those superb "soldiers of the sea."

The hospital corpsman ashore with the marine had to be versatile and adaptable. He had to act in France as chauffeur for the regimental surgeon's ambulance and driver for the motor cycle; he had to act as mechanic, teamster for the animal-drawn ambulances and medical carts, mounted horse orderly, cook, messman, orderly, clerk, and in many capacities other than the strictly professional ones. Men were selected because of their previous experience and knowledge, together with their adaptability and proficiency when tried out. One could not but be amused to see a Navy hospital corpsman dressed in

Army khaki, steel helmet tilted in good old Navy fashion on one side of his head, gas mask tied over his chest in the "alert" position, hobbled-nailed shoes covered with a thick layer of mud, harnessing an Army mule, hitching him to a two-wheeled cart, and then climbing into the seat, which he called the "bridge," directing his "mate" to climb in over the "starboard" side; fasten the tail gate in the "stern"; sit down on the "deck." This "flatfooter," with a call "gangway" to his comrades ahead, "navigated" a very obstreperous mule down the wooded road to where the daily supply of water must be obtained for use at the regimental aid-station dugout.

One regiment had a pharmacist who was only permitted to remain in the field until the brigade was taken out of the Verdun sector. His departure for other duty was a sad day for the regiment. He had had many "hitches" in the Navy and breathed salt air into the surroundings, fast but reluctantly becoming an Army instead of a naval organization. He had the sailorman's roll, the sailorman's manner and figure of speech. Perhaps it was harder for him than any other, except some of the older officers, to acclimate himself to the new order of things. While his sense of humor was keen and his witticisms cheered when things seemed gloomy, he could express himself very creditably in the vernacular of the seaman when the occasion demanded. It is not known whether he ever missed a meal from a rough sea, but it is known that the Boche made things too rough for him to attend all meals at his mess some half mile from the dugout. Strange how one's appetite suddenly disappeared when Heine dropped them over in close proximity to one's abode! While this pharmacist's station was a mile or two behind the line, he wanted to take over an aid station just behind the front line. His wishes were gratified. Whether Heine felt that a little show would be particularly entertaining to this down-easter or that he could capture a novelty specimen is not known, but there was a visitation one night of gas shells and a heavy enemy barrage which temporarily turned this sailorman into a pillar of salt. This experience, no doubt, will be a source of entertainment to his friends for many years, for he is an excellent story teller.

It was while in the trench sector that efforts were made to augment the stretcher-bearer force, which was composed merely of members of the regimental bands. Hospital corpsmen must be considered only as dressers and attendants and not as stretcher bearers. No uniformity was adopted in the regiments, but in some battalions details were given from line troops. The band was divided between the battalions holding the lines while the reserve group attached to the reserve battalion took stations at the regimental-aid post. This station was usually a mile or so behind the actual front line and although occasionally subject to high-explosive bombardment, was

not under more or less continuous fire, as were the forward stations. The men here could have three hot meals a day and bed bunks to sleep in, either in dugouts or shacks, depending upon the activity of the sector. A definite detailing of stretcher bearers from the line was not realized until late summer. Force of circumstances brought conviction. The necessity for action seems to be based upon failures and shortcomings.

The hospital corpsman in the trench sector was being schooled in modern warfare along with his brother in the line. He accompanied the latter on raids at night into no man's land; he learned to follow a barrage; he learned to protect himself, to seek shelter, to recognize shelter and appreciate just what shelter meant; he became disciplined in gas; he was impressed with the seriousness of war; he realized that he must conserve himself for service to others without faltering under any circumstances. He learned, above all, that discretion is the better-part of valor. Life in trench dugouts becomes monotonous if one is satisfied to remain dormant, eating and sleeping and just doing the absolute necessities. The line have their posts to man, old trenches to keep in repair by day and night, new ones to dig, new dugouts to build, drainage to establish, wire to string before the line, raids to conduct at night for identifying enemy units. The hospital corpsman must maintain an interest in his men and his surroundings, and therefore he must accompany and assist them on their missions. He thus learns the value of terrain and how to conduct himself under all circumstances. He becomes a part of a fighting machine. Neither the doctor nor hospital corpsman who hugs his dugout ever becomes a soldier. To do so is to show a lack of the real qualities of a soldier, initiative and courage.

One hospital corpsman, that he might satisfy both his appetite and his adventurous spirit, frequently made solitary pilgrimages into No Man's Land at night to gather rhubarb and dandelion. There is no doubt that this man's initiative and courage in the trench sector made him one of the most fearless and resourceful men in the stress of battle in the open. His physique was slight, his constitution below normal, but he had what we like to call "guts." This is a word possibly tabooed in so-called polite society, but it would be better for our race were it more commonly used; for it bespeaks a most enviable and desirable individual characteristic. If the soldier says, "That fellow has guts," you recognize the man referred to as possessing the most admirable of all qualities. The civilian needs "guts" as well as the military. To face opposition and criticism in the accomplishment of right requires "guts." Our country has been during the war, soldier and civilian; now it will be civilian and soldier. They must coexist. The most admirable qualities of the latter must be found in the former if the principles for which we

fought on the fields of France are to be fought for in civil occupations in our native land. We strive toward greater accomplishments when some one says, "Come now be a soldier!" That word represents ideals, qualities, characteristics which we are urged to emulate. We feel that to be a soldier embodies the loftiest ambitions and attainments. In passing, the writer can not resist imploring everyone who may read this article to be a soldier in the ordinary walks of life. It has been his privilege to find the ideal soldier and to have seen him under the most trying circumstances in this great war. If we all become soldiers in the broad sense, enlisted in the service of right, there will be no cause for alarm as to the welfare of our beloved country.

To quote Donald Hankey: "Actual experience of war brings the best men to the fore, and the best qualities of the average man. Officers and men are welded into a closer comradeship by dangers and discomforts shared. They learn to trust each other and look for the essential qualities rather than for the accidental graces. One learns to love men for their great hearts, their pluck, their indomitable spirit, their irrepressible humor, their readiness to shoulder the weaker brother's burden, in addition to their own. One sees men as God sees them, apart from externals, such as manner and intonation. A night in a bombing party shows your friend Smith as a man of splendid courage. A shortage of rations reveals his wonderful unselfishness. One danger and discomfort after another you share in common till you love him as a brother. Out there, if anyone dared to remind you that Jim was only a fireman while you were a bank clerk, you would give him one in the eye to go on with. You have learned to know a man when you see one, and to value him. When the war is over, and the men of the citizen army return to their homes and their civil occupations, will they, I wonder, remember the things that they have learned? If so, there will be a new and better England for the children. One would like to prophecy great things. In those days, great talkers and boasters shall be of no account, for men shall remember that in the hour of danger they were wanting. In those days there shall be no more petty strife between class and class, for all shall have learned that they are one nation, and that they must seek the nation's good before their own. In those days men shall no longer pride themselves on their riches, or on the material possessions which distinguish them from their brethern, for they shall have learned that it is the qualities of the heart which are of real value. Men shall be prized for their courage, their honesty, their charity, and their practical ability. In those days there shall be no false pride, for all have lived hardly, all have done dirty and menial work, all have wielded pick and spade, and have counted it no dishonor but rather glory to do so. In those days

charity and brotherly love shall prevail mightily, for all shall have learned mutual understanding and respect."

The middle of May found the marine brigade as part of the Second Division, moving back to rest billets near Vitry-le-François. From there many French military trains moved the division around Paris to billets behind Montdidier. The regiments and smaller units were unaware that the division was in reserve behind American, French, and British troops. The promise that the division was to return to the old training area in the Vosges was not to be realized. Barrack bags which meant to the hospital corpsmen much personal naval property would be lost. They were put into that huge military pot salvage. Now, a Navy hospital corpsman at that time bought all his clothes while the Marine and Army had a gratuitous issue; nevertheless, his property, with all the other men's was salvaged. Perhaps just recompense will some day be made. The lost letters, family pictures, little personal mementoes can never be recovered. However, it would seem that the old, worn French phrase must be used to soothe disappointed hearts: "*C'est la guerre!*" It will be noted that the word barrack bag has been used in place of sea bag, but many things, one and the same, receive different names when speaking in the language of the sea on shore. This loss was considered of prime importance to the hospital corpsmen at the time, but with the loss of buddies and pals, bunkies and mates, it was forgotten, considered insignificant, in comparison to the human losses.

May 30 was properly celebrated with religious services for our honored dead. With the Marines the hospital corpsmen of the Navy had felt the pall of war, for the first sacrifice had been made in their ranks the month previous. The seriousness of the occasion was felt, but how infinitesimal it was in comparison with what it would have been had the facts of the approaching months been revealed! No one thought, no one suspected that, within one month's time, the number of our honored dead was to be many times multiplied. The month of June will ever be seriously and reverently associated by Marines who fought in France and, yes, by Marines everywhere, with Belleau Woods and the glorious defense of Paris. The dramatic rushing forward by camions (French auto-trucks) of the Second Division and its being thrown into the line, after a 36-hour ride across country and a forced march on empty stomachs, astride the Paris-Château-Thierry Road, is now history. The memorial services were scarcely concluded when the division was making hurried preparations for its departure. May was slipping away as another year. June was approaching—the beginning of a new era for the little band of Marines. The spirit of a young Marine officer

who gave his life near Belleau Woods was typical of the spirit of the Navy hospital corpsmen after he had tasted battle and felt the sufferings of a weary and worn body. He may not have been able to express it himself, but his officer could quite readily, as he was a close observer of his men. The following lines from a letter written by a young Marine officer express the character of the spirit:

Beautiful June is here; what will it bring? I am going into line again, and never felt happier over anything in my life. So far I have been miraculously untouched, and it is surprising how much steel can pass you and yet leave you untouched. Something tells me I am going to have a chance this time. France has lost, or sent, all the young men and only the aged and infirm remain, and the helpless and grief-stricken women and children. If you could only see! Always so willing and ready to do anything to help. Sometimes I am so tired and weary that I stumble, and have to laugh at myself. I am so glad of the chance to stand between these and the terrible enemy. Our glorious brave boys of German descent are out to fight down the wrong principles instilled for generations into the people. We shall live forever in the result of this war. The cost of war has gone up in lives as well as money, but the higher the price the more valuable the purchase.

If the hospital corpsman did not have this spirit prior to the June fighting, he had it when he saw the long line of refugees trudging with heavy steps and bowed heads into the heart of France, in flight before the onrushing enemy; or when he charged with his units through the ripened wheat fields into that inferno, the Bois de Belleau; or when he had tirelessly toiled in the care and evacuation of the wounded, when comrade after comrade fell. He left the battle line respirited, with the spirit typified by the youthful Marine officer.

Perhaps the many accomplishments of the marines in France will not be remembered and their stand at the taking of the Bois de Belleau will stand out singularly. This was their initial great engagement, but those who served with them will ever remember with equal clearness the other great engagements—Soissons, St. Mihiel, Champagne, and the Argonne-Meuse. In each operation the naval hospital corpsman performed glorious deeds. While acts of heroism in many instances received recognition in the form of awards of the distinguished service cross and croix de guerre, in honor to the men it must be stated that recognition never prompted action. Every hospital corpsman who has performed most hazardous and courageous deeds has been actuated entirely by a high and noble sense of duty. Dangers have always been faced in the lofty spirit of service to others, with the protection of self only secondary to attainment.

The Hospital Corps has lost many of its members on the field of honor. Death has come truly in the line of duty; for death has been the result of service to fallen comrades. The true Christian spirit has been displayed time and time again, when hospital corpsmen have gone to the help of the wounded when certain death seemed imminent and oftentimes resulted. There was never faltering, never a ques-

tioning as to action where wounded were concerned. Rifle or machine gun bullets, high explosive shells, gas infested areas, held no terrors for these brave lads, if their professional services were required. To repeat, let us reverently honor those who have gone "out there" never to return, whose true spirit of service was never failing in the hour of greatest need. Some of the noblest, most glorious, most courageous acts of sacrifice and heroism will never be known. They have passed unnoticed with many of the gallant ones.

Volunteers for special missions forward were readily obtained. It was far more difficult to obtain hospital corpsmen for special duties some distance behind the line. Assignments to details out of danger were reluctantly received. Wherever possible men were not re-detailed for rear duties. Certain ones having special qualifications for definite positions, while reluctant to remain behind, perform most commendable and important service to their respective organizations.

During Belleau Woods days, the band as stretcher bearers suffered heavy casualties in their never-to-be-forgotten and most valiant self-sacrificing service. Their work was closely allied to the hospital corpsmen's and they were a part of the medical department in combat. An honorable and glorious addition they were, too! When the tired and exhausted handful of marines was taken out of the line there were but few members of the band left to cheer up those depressed, tired spirits, and orders rightly prohibited their further use as stretcher bearers. This action brought another. Twelve men from the line from each company were detailed to the medical department for training and use as litter bearers. The men detailed were ordered to report automatically upon the regiment's going into line, to the regimental surgeon and were available, for instruction periods when regiments were in rest. This gave the regimental surgeon 144 additional men to take charge of; the battalion surgeon 48 men and each company hospital corpsman 12. These men were replaced from the line as casualties in their ranks occurred. While their work was to be strictly that of bearers, they were given considerable instruction in first aid that they might meet the emergencies of the battle field and be of even greater assistance to company hospital corpsmen. They were to wear brassards of blue with "L. B." in white in contradistinction to the hospital corpsman's Red Cross brassard. These men did excellent work and were of inestimable help to the department.

Hospital corpsmen had much to do with the high morale of the troops. When worn by the most trying circumstances, when men's minds were weakened by physical and nervous exhaustion, frequently it was the hospital corpsman who talked it over and boosted the weary one up, so that he took a new hold and went about his unpleasant task. When a certain platoon was charging a ma-

chine-gun nest in Belleau Woods, several unsuccessful attempts, with heavy losses, had been made. The handful of men left had drawn back prior to making another charge. The hospital corpsman attached to it yelled out, with considerable profanity to add to the forcefulness of his demand, in the thick of the hand-to-hand fighting, "Go on you — take that gun. If you fall, I am here to take care of you." The gun was captured shortly afterwards in a deadly grapple.

In a little stone farmhouse, about midnight, where one of the aid stations was located, there were a number of wounded lying about on straw or propped up against the walls waiting their turn for dressing and evacuation. The Boche was laying down a barrage between it and the woods while attempting a counter attack. The orchard in the rear of the building was being plowed up by the raining shells. The old structure was swaying and those laboring unceasingly within over the wounded, had a secret conviction that their work would be suddenly concluded at any moment. The medical officer and several hospital corpsmen were setting a bad compound fracture in a Thomas splint, and dressing other multiple wounds in a vain effort to hold the spark of life still present in their marine patient. Not a word was spoken; the closer the shells fell to the building, the faster this little group under the flickering candle light toiled. The barrage lifted once more, leaving the station untouched. When morning broke and the night's toll had been cared for and sent on back by those little ambulances moving like twisting, swaying, quadrupeds over the limestone roads to the field hospitals, the chief hospital corpsman came to the medical officer and asked whether he was aware of the proximity of the bursting shells during the night and the almost certain death that seemed imminent to those in this station. Of course, the doctor was conscious of his surroundings but not outwardly so. But his realization that each hospital corpsman, while knowing his nearness to death, never showed the slightest sign of fear, but carried on without hesitation, comforting and quieting the nerve-worn wounded, filled him with pride and confidence in their ability to always maintain that high pitch of morale worthy of men of courage.

A tall, lean boy from the Middle West established a dressing point in a shell hole out in a wheat field before Tigny in the Soissons drive. While his selection of a site was not due to his own best judgment but entirely to force of circumstances, he made the best of his location. He gathered in wounded, crawling out on his belly under terrific machine-gun fire, and dressed their wounds in this crude, unprotected station. It was impossible to transport them to the battalion or regimental stations before nightfall, but when darkness came he and his little group of wounded marines were carried back. His repeated trips through the wheat from one wounded to another

encouraged those attacking the machine-gun-infested town to keep up their charging, for they saw and knew that there was immediate care for them as they fell—a tremendous consolation in battle. Although his had been a day fraught with the utmost dangers and one demanding his greatest physical efforts, he volunteered to direct stretcher-bearer parties all through the night to the most advantageous positions where he knew wounded to be. Another hospital corpsman passed up and just behind the front line, collecting the wounded with ambulances while yet dark. It was due in a great measure to the fearless and intelligent work of these boys that dawn saw the field cleared of wounded. It was a race with dawn, for had that black curtain risen before the many, many wounded lads had been brought in, it would have meant their lying unapproachable in the scorching July sun and under the evening's fire, without water and with wounds undressed, until darkness once more gave the protection necessary for their relief.

The hospital corpsman is not superhuman even in battle, and knows well the limitations of his physical powers. As an instance of this, a humorous incident occurred when one regiment had been relieved and sent to a wood to rest and get some food and much-needed sleep. The Boche ascertained its position and shelled the woods most of the night. The little extemporized shelter from the heavy midsummer rain and the splintering shells, erected by individuals out of boughs and leaves, had to be abandoned and refuge from the enemy's hate sought in the open wheat field. The officers and men scattered, some lying in the trampled grass, others in shell holes, old trenches, gutters, etc. The writer was complaining the next morning of the waterbugs crawling over his neck and face as he spent the night trying to sleep in a semilying position in an old trench filled with mud. A chief pharmacist's mate of some 12 years' service overheard the complaint and drawled out "Hell, doctor, that's nothin'. I fell in a latrine and was too tired to crawl out." In the darkness he had fallen into a shell hole which the previous day had been used for that purpose.

Many examples could be related of the multitudinous deeds of valor of the Hospital Corps, but they must be left to individual telling.

Whenever the organizations were out of the line, school was carried on by the battalion units under the regimental surgeon's direction. Particular emphasis was laid on bandaging, splinting, control of hemorrhage, gas defense, etc., and the correction of noted faults in dressing and caring for the wounded on the field and in aid stations. New replacements were constantly arriving, who had to be instructed in modern, practical field service. Drills with litters were insisted upon, that men might be kept physically fit, competent in

directing the field litterbearers, and that as units discipline might be exacted. The writer is a firm believer in a "good set up" to hospital corpsmen. In no better way can hospital corpsmen be disciplined than by close-order drill. In combatant organizations in the field scrupulous obedience, rigid discipline, smartness, alertness, snap, strong, healthy bodies, and clear, quick-thinking minds, with nerves of iron, are absolutely essential requisites. These are obtained, to a great extent, by drill. A medical officer is frequently complimented by his military superior on the appearance and conduct of his men, both in and behind the line in rest billets, if his unit is deserving of commendation. A medical unit that is thoroughly painstaking in the little things proves its efficiency, and if efficient commands the respect and confidence of the line personnel.

At a regimental review a certain regimental surgeon was highly complimented by the regimental commander, who turned his horse before his command after the troops had all passed by and said: "The Hospital Corps and the band have made the best impression. They are better set up, march with better time, carry themselves better, and have made a better general appearance than any other unit in line." Wheeling his horse about before the regimental surgeon, he concluded, "Doctor, I congratulate you." Were not officer and men repaid for the hours spent on the drill ground? That little incident helped materially in maintaining a splendid *esprit de corps* in that regimental medical department. Personal contact, a keen appreciation of individual temperaments and characteristics, with a broad viewpoint and a flexibility of mind, is essential in the medical officer in his relations to hospital corpsmen.

A quotation from a letter¹ of a chief pharmacist's mate to his loved ones at home shows the transformation and enlightenment of the mind, with a deep awakening of the spiritual, after battle experiences:

To-night, the first time for ages, my emotions are effervescing, the bubbles of which have swelled into a thick foam, completely involving the quiet, clear liquid of my normal life, as effervescing liquids do, and are now at the point of overflowing, finding exit in tears—real tears—tears of longing, tears of love, tears of remorse, tears of joy, tears of loss, tears of appreciation, of you, of life, and the why and wherefore of things in general. The reason for these, no doubt, you are wondering by this time, why? Well, I will tell you. To-night, the evening of France's Independence Day, real Sabbath, the first I have had since I was last home—it seems as though it was during another life—I have heard music—real American music—and this, which once, and, to you (forgive me for saying it) meant so very little, other than pleasant diversion, is the reason for all that I feel to-night, which defines a condition of spirit a civilian hopes to realize after life has passed and which only a soldier, an American soldier, torn away from his life's very all, in a distant, foreign country, fighting

¹ This was written after the battle of Belleau Wood, July 14, 1918, when the troops were back in the corps of reserves.

for principles projected upon him as a thing which is good, and a thing for the betterment of mankind in general, which must be to him his religion. This you may not be able to appreciate, nor can anyone, unless that one has passed through the very same experiences and has lived these experiences as my comrades and I have here. In civil life your greatest tragedy is the loss of something momentary, blasted hope in the realization of something of a momentary nature, generally, or perhaps, a broken love. These you consider tragical, the culmination of which, when life has ceased and you truthfully feel that you have suffered unjustly, will bring you as amelioration a condition of spirit which you call "Heaven." This is the most pleasing and agreeable condition of spirit known to a human creature under the normal conditions of peace. These are in fact small tragedies—but ripples upon the surface of a small pond in comparison to the pounding billows breaking upon the surface of our hurricane-ridden sea.

(Written after the Soissons offensive.)

JULY 28, 1918.

The uncertainties of war, which I fully comprehend, have even at this point, where I had hoped for certain to complete this note, called for an interruption, which sent my comrades and myself again into battle—not purely an American battle as was the last one (Belleau Wood), but one composed of the forces of the allied armies. Here Dame Fortune again favored us. This battle, which we have just returned from, tired, hungry, and in rags, but not disheartened—instead highly elated from the fruits of our victories—has been the most gigantic effort of the Allies, and has been heralded all over the world, for, for the first time, I believe, the Germans have been driven backward. You are still reading of the allied advances, and when you do read about them you may justly console yourself with the knowledge that your son participated in the first day's battle, took part in the initial shock, which rang the world over, the hardest part of the entire fight, which sounded the death knell for the Boche, and made the great advance upon the Marne northward possible. I would love to go into detail and tell you all that I have experienced in this fight, of valor that I have seen, privations, suffering, exhaustion, and the conditions under which we fought—Oh, so willingly!—of our wonderful advance, of the utter bewilderment of the Huns, of the prisoners, of the guns, material captured, etc., but all of this is prohibited by the censor, and I can only continue with my original letter—a few weeks late—which describes fully the heart of a soldier after an experience in battle.

I have learned what love is here on the battlefields of France. I know it truthfully, just as my living and dead companions know it. I have seen it dawn upon them, day by day, action by action, just as they have noted the same change in me. And we notice the contrast between our God and the God we were taught about in civil life. We know that our God is the real God, Love. We practice this unconsciously because we love each other, in our poverty, suffering, joy, and sorrow; we suffer for each other; we die unhesitatingly for each other, with a happy smile upon our lips, knowing that we die truthfully loved, and that by dying, some day—perhaps vain hope—that every creature in the world will know that same love for his fellow creatures. Without a single thing that you can call your own, but with a handful of hard bread to satisfy your weak, empty stomach and a spoonful of dirty water to moisten your burning lips, which in times of battle are exquisite luxuries, you give them unhesitatingly to a less fortunate comrade, become angry if he refuses to accept them, although, at the same time, you feel that life will leave you without their stimulation, and, as is usually the case, your comrade with death upon his face will

refuse your sacrifice, knowing that by your loss of it you will suffer, or perhaps another in the group is more deserving.

Such are the feelings of a soldier who feels sorrow, because he loves with God's love, and because he knows God, who is Love. Simple, isn't it? And consequently instead of fearing death, he courts and invites it, because he loves, truthfully loves, and is loved—truthfully loved—and is supremely happy. He possesses nothing, absolutely nothing worldly; his life is all. He is a king, from our way of looking at it, because he is free, loved, loves, and is happy. Perfection can be achieved!

If he knew—at least he believes that such will exist at home after this "God's stay on earth" is over. If he thought that it would not, he would accept death in preference. Really, if you could see both sides as distinctly as he, you would not blame him for saying it, but would choose his belief. Life now without God's love, entirely and universally, will be intolerable to him. He knows it and will have no other. It is up to the people at home to learn it as he knows it, by sacrificing for this same cause with their entire heart and soul, exercise it, establish it, and keep it, so that when we do finally return we will find it as we expect it, and will not suffer our losses "over here" and for God in vain.

I assure you that I am not the only soldier in Europe that feels this way. Everyone will—most of them do now. The ones that do not now are the ones that have never tasted battle. They will learn when their splendid opportunity comes, which will be very soon.

This is the result of the effect of music—as I said—the first that I have listened to for ages; it seemed as though during another life, and true it was. Music—the consort of love—nearly awakened me, and I have felt this feeling and found God in battle. I did not find Him before because I was thinking of death. That was the last thing I was thinking of. It just dawned upon me the same as it dawned upon my comrades. The music compelled me to mention it.

In concluding this article, it is a very great pleasure to be able to state that not one of the some two hundred odd hospital corpsmen that came under the writer's command in over a year's time was ever taken before a commanding officer for disciplinary action, and not one was admitted with a venereal infection. This in a foreign country, where the code of morals is very different from our own, where wine is drunk freely—a factor in lowering moral standards and weakening conviction—in a war-torn country, where the strain of battle is frequently relieved by immoral indulgence, testifies to the highly commendable character of the naval hospital corpsmen, not only as "soldiers" but as honored and respected young citizens of a great Nation.

Ay, War, they say, is hell; it's heaven, too.

It lets a man discover what he's worth;

It takes his measure, shows what he can do,

Gives him a joy like nothing else on earth;

It fans in him a flame that otherwise

Would flicker out, these drab, discordant days;

It teaches him, in pain and sacrifice,

Faith, fortitude, grim courage past all praise.

Yes; War is good. (ROBERT SERVICE.)

THE INSTRUCTION OF THE HOSPITAL CORPS ABOARD SHIP.

By W. S. PUGH, Commander, Medical Corps, United States Navy.

In organizing the medical department of this vessel and the instruction of its Hospital Corps the following idea has acted as our guide:

The mission of the U. S. S. *Mississippi* being to be the most efficient unit of the fleet under war conditions, it behooves us to organize thoroughly with this in view.

The most important factor tending to efficiency in any organization is concerted action or teamwork; in other words, groups of people working together for the common welfare; each man endeavoring to keep up his end and stimulate others to emulate his endeavors.

The great increase in the Navy and Marine Corps with an associated enlargement of the Hospital Corps naturally puts a great premium on trained men. There is a great reduction in the number of trained men and an enormously increased demand. How often we hear the expression, "I can not obtain any trained assistants." That is true and obtains everywhere, but there is no use making a fuss over this apparent shortage of trained men. There is only one way the situation can be remedied and that is by the intensive training of the untutored recruits. What one can do in the matter of training will depend largely on the mental receptivity of the untutored and the pedagogic powers of the instructor. When both parties enter the field with enthusiasm it is surprising what can be accomplished in a very short time. As an instance of this is the case of a man who, after receiving but a few months' training, assisted me at an emergency nephrectomy, controlling completely all the hemostasis without a quiver. In addition to the above, another instance may be cited where hospital corpsmen were landed and found fully capable and competent to organize wards and operating rooms in a very short space of time for the care of over 1,000 people sent to them.

It is not mere ability to handle medical and surgical work that is needed. The Hospital Corps needs development along the lines of clerical or administrative work and ability to handle men.

Perhaps the most important item in our department is the proper preparation of paper work. Many mistakes are overlooked, but let a man make one mistake in his paper work and the torrent of comment will be as great as if he had sunk the ship.

Many medical officers feel that hospital corpsmen should be trained ashore. This the department endeavors to do, but it is practicable to give them only a limited amount of training ashore and there are many parts of their duties that can not be learned ashore.

With this in view, it is always wise to begin the training by taking for granted that the men know nothing of what you are about to impart. Treat your early classes as kindergartners and do not forget yourself and think that you are talking to medical men, thereby soaring high over the heads of your auditors and causing them to become sleepy. This results in the waste of both your time and theirs.

In the beginning it was found necessary to group all hospital corpsmen in a junior class to receive the instruction outlined by the medical officer and given by the junior medical officers and the pharmacist, as per schedule attached. When a subject was taken up it was gone into from every standpoint, and other subjects were not considered until everyone had a good general knowledge of each topic.

Every effort was made to hold the interest of the men and make them feel that they were a very important part of the fighting machine, and that much depended on them in the work of keeping their shipmates fit to fight.

In addition to the appended schedule, every possible case was utilized for clinical demonstrations; in fact, we have been running a continuous medical and surgical clinic similar to that of the medical schools. All of the methods used in case handling were practically demonstrated by the medical officer or his assistants, as the following schedule will show:

INSTRUCTION PERIODS FOR JUNIOR MEMBERS OF HOSPITAL CORPS.

Monday a. m., anatomy and physiology, second junior medical officer.
 Monday p. m., clerical work, pharmacist.
 Tuesday a. m., sanitation and hygiene, first junior medical officer.
 Tuesday p. m., chemistry and pharmacy, chief pharmacist's mate.
 Wednesday a. m., first aid and surgical nursing, third junior medical officer.
 Wednesday p. m., medical nursing, second junior medical officer.
 Thursday a. m., operative drill, third junior medical officer.
 Friday p. m., materia medica, pharmacist.

The details of the various subjects taken up are made clear by the following synopsis:

ANATOMY AND PHYSIOLOGY COURSE.

The first course in anatomy and physiology will be taken up in six lectures and quizzes. The lectures on the above subjects will be held every Monday morning at the place set aside for instruction. Each class to be for one hour, 40 minutes to be given to lecturing and 20 minutes to quizzing on the subject of the previous period.

1. Definitions, embryology and minute anatomy.
2. Osteology and syndesmology.
3. Muscles, circulatory system and the blood.
4. Respiratory, digestive, and lymphatic systems.
5. Excretory apparatus and nervous system.
6. Review of the course.

HYGIENE AND SANITATION.

Tuesdays (10.30 a. m. to 11.30 a. m.):

1. (a) General, (b) foods, (c) mess management, (d) quiz.
2. (a) Water, (b) quiz.
3. (a) Personal hygiene, (b) air and ventilation, (c) quiz.
4. (a) Heat and light, (b) disposal of waste, (c) quiz.
5. (a) Prevention of disease, (b) quiz.
6. (a) Prevention of disease, (b) quiz.
7. (a) Disinfection, (b) quiz.
8. (a) Embalming, (b) quiz.
9. (a) Field hygiene, (b) on the march, (c) quiz.
10. Review and quiz.

COURSE IN FIRST AID AND SURGICAL NURSING.

The above course will be taken up in a series of eight lectures and quizzes. Each subject will be discussed and the first aid and later care will be described.

1. Emergencies, contusions, wounds, and bandaging.
2. Hemorrhages and their control.
3. Dislocations, sprains, fractures, first aid, and permanent treatments.
4. Injuries by foreign bodies and the effects of heat and cold.
5. Insensibility and fits.
6. Asphyxia.
7. Poisons.
8. Résumé of course.

MEDICAL NURSING AND DIETS.

The above class will be held Wednesday afternoon at the place assigned for instruction.

1. Admission and first care of patient.
2. Use of hypodermic syringe and thermometer; administration of enemas and douches and use of catheters.
3. Lavage, gavage, stupes, counterirritants, massage, and care of contagious cases.
4. Preparations for catheterization and technique of same.
5. Management of contagious cases.
6. General management of fever cases.
7. The different diets; preparation and serving.
8. Résumé of course.
9. Venereal diseases and methods of handling them.

(NOTE.—The above will be followed by a series of lectures and demonstrations on beds and bed making.)

BEDS.

The art of bed making (see Warnshuis, pp. 229-241).

The change of covers without disturbing patient.

Changing of the undersheet.

Changing a soiled mattress.

The draw sheet and its uses.

The fracture bed.

The post-operative bed.

The elevation of foot or head of bed.

The relief of abdominal tension by pillows.

Backache and its relief.

Bedsore, their prevention and treatment.

The morning bath (well illustrated in *Principles of Surgical Nursing*, by Warnshuis, pp. 219-229).

The slush bath.

Tub bath in bed.

OPERATING ROOM DRILL.

The course in operating room drill will be taken up in a series of lectures covering the following subjects, each subject to be gone over as often as the medical officer may deem necessary:

- (a) Preparation of room and surroundings.
- (b) Preparation of dressings, instruments, and rubber gloves.
- (c) Instruments used in various operations.
- (d) Preparation of operator and assistants.
- (e) Preparation of the patient.
- (f) Technique of assistance at operations.
- (g) Post-operative care of patient.

CLERICAL WORK, ETC.

Outline of a course of study for junior members of the Hospital Corps:

First day: Typewriters, their use; care; method of changing ribbons; carbon copies; stencil for mimeograph.

Second day: Abbreviations used for various ratings. Official and nonofficial letters; demonstrations on blackboard.

Third day: Regular and ship forms used daily on board this ship. During interval between classes each student will prepare an official letter and present it at next class.

Fourth day: Lecture on various forms used in the medical department. The class will be required to memorize the title and use of each form and will be quizzed at next lesson.

Fifth day: Weekly and monthly forms. Class will be given special instruction relative to monthly reports and will be required to make out a set.

Sixth day: Special forms used in medical department.

Seventh day: Methods of making requisition for supplies.

Eighth day: Method of keeping track of stores.

Ninth day: The supply table.

Tenth day: Filing systems.

Eleventh day: Health records.

Twelfth day: Recruiting.

MATERIA MEDICA.

First day: Definitions. Principal terms descriptive of the therapeutic action of medicines and their meanings. Class will take notes.

Second day: Quiz on previous lesson; continue lecture on descriptive terms. Class will take notes.

Third day: Methods of administering medicines, dosage, etc. Quiz on previous lesson. Class will take notes.

Fourth day: Quiz on previous lesson. Medicines on supply table. Class will take notes.

Fifth day: Quiz on previous lesson; continue with medicines on supply table. Class will take notes.

Sixth day: Quiz on previous lesson; continue with medicines on supply table. Class will take notes.

Seventh day: Quiz on previous lesson; continue with medicines on supply table.

Eighth day: Quiz on previous lesson; continue with medicines on supply table. Class will take notes.

Ninth day: If course has thoroughly covered medicines on supply table a review on course will be held; otherwise continue.

CHEMISTRY.

First day: Introduction, analytic chemistry.

Second day: Descriptive chemistry, general chemistry.

Third day: Properties of matter.

Fourth day: Atoms, molecules, elements, compounds.

Fifth day: Atomic weight, molecular weight, symbols, formulae, valence.

Sixth day: Acid radical, basic radical, classification of elements, chemical affinity.

Seventh day: Reagents, acid, base, neutral substance, salts.

Eighth day: Chemical formulae; empirical, graphic.

Ninth day: Law of chemical composition; law of Boyle, law of Avogadro.

Tenth day: Elements; source, physical properties, chemical properties.

Eleventh day: Atomic weight, chemical symbol, valency, relation to animals.

PHARMACY.

First day: Pharmacopœia and other books, metrology, specific gravity, heat.

Second day: Application of heat, comminution, apparatus, solution, lotion.

Third day: Decantation, colation, filtration, clarification.

Fourth day: Decolorization, separation of immiscible liquids, separation of solids from liquids, precipitation.

Fifth day: Crystallization, granulation, exsiccation, dialysis, extraction.

Sixth day: Galenical preparations, water and spirit, mucilages, sirups and honeys, elixirs.

Seventh day: Glycerites, collodions, oleates, infusions, decoctions, fluid extracts.

Eighth day: Wines, oleoresins, vinegars, powders and pills, suppositories, solid preparations for external use.

Ninth day: Prescriptions.

Tenth day: Incompatibility, official fluid extracts, official tinctures, glucosides, and alkaloids.

SURGICAL NURSING.

Course in bandaging and fracture dressings—Types, styles, and materials:

Standard bandages.

Sizes.	Yards of muslin.
$\frac{1}{4}$ -inch	1
$\frac{1}{2}$ -inch	3
1-inch	6
2-inch	9
3-inch	10
4-inch	

HEAD AND UPPER BODY.

1. Anterior and posterior capelline; single and double roller.
2. Transverse capelline; single and double roller.
3. Cross angle of jaw.
4. Mastoid dressing.
5. Fractured jaw; Barton and Gibson.
6. Eye; figure of eight, single and double.
7. Figure of eight, head and neck.
8. Figure of eight, neck and shoulders.
9. Anterior and posterior figure of eight of chest.
10. Spica of shoulder.
11. Fracture of clavicle; Velpeau and Desault.

ARM.

1. Figure of eight.
2. Single spiral.
3. Rapid spiral.
4. Spiral reverse.
5. Finger bandages.
6. Gauntlet and demi-gauntlet.
7. Recurrent of stump.

LOWER EXTREMITIES.

1. Spica of groin—ascending and descending, single and double roller.
 2. Figure of eight of knee.
 3. Bandages of foot and ankle.
- Triangular bandage and its uses.
 Two, three, and four tailed bandages.
 Abdominal bandage and Scultetus.
 The use of fixed dressings: Starch, silicate of soda, dextrin, plaster of Paris.

ADHESIVE PLASTER DRESSING.

1. As an adjunct to bandages.
2. Sayre dressing for fractured clavicle.
3. Strapping of chest.
4. Strapping of lumbar region.
5. Strapping of testicles.
6. Strapping of knee and wrist.
7. Strapping of ankle.
8. Buck's extension apparatus.

SPLINTS.

1. Materials used.
2. Sizes and forms.
3. Padding of splints.
5. First-aid treatments (with signs and symptoms).
6. Fractures of skull and spine.
7. Fractures of jaw.
8. Fractures of clavicle.
9. Fractures of shoulder.
10. Fractures of arm and forearm.
11. Fractures of sternum and ribs.

12. Fractures of pelvis.
13. Fractures of thighs.
14. Fractures of patella and legs.
15. Fractures of hand and foot.
16. Fractures, compound.

DISLOCATIONS.

1. Signs, symptoms, and treatment.
2. Jaw.
3. Shoulder.
4. Elbow.
5. Wrist and fingers.
6. Hip and knee.
7. Ankle.

ADVANCED WORK.

Naturally those who were particularly studious advanced more rapidly than others. Examinations were held monthly and the more proficient were advanced. It then became necessary to organize an advanced class with the senior medical officer as the instructor. Men were admitted to this class when they reached the rate of pharmacist's mate, second class, and instruction was given as per schedule. As a rule two lectures were given on Tuesday, one at the 7 a. m. surgical clinic, in which all practical problems were taken up. The 10 a. m. lecture, following, was for the purpose of quizzing and answering questions in surgical technique. In the surgical clinic every man has an opportunity to learn all the surgical features, including anesthesia. We usually start our operations with a circumcision, and here are demonstrated the methods of ordinary surgical technique, local anesthesia, hemostasis, and the use of ligatures and sutures. Later more advanced cases were taken up.

The following organization for surgical clinic is carried out:

Medical officer, operator.

Hospital corpsman, first sterile assistant.

Hospital corpsman, second sterile assistant, handles instruments and dressings.

Hospital corpsman, unsterile assistant.

Hospital corpsman, censor.

When general anesthetics are used, one man is trained in their administration. Hospital corpsmen take a great interest in surgical and laboratory work, so that the instructions given here have been comparatively easy.

ADVANCED CLASS HOSPITAL CORPS.

Monday: Advanced clerical work—

Commissariat.

Naval medical supply depots.

Hospital organization and administration.

Equipment of hospitals and hospital ships.

Tuesday: Surgical clinic—

Anesthesia, local and general.

General operative technique.

Surgical assistance at operations.

The handing of instruments.

Sponging.

Hemostasis.

Application of ligatures.

138105°—19—5

Use of retractors.
 Use of sutures.
 Preparation of drains.
 Post operative dressings.
 Operating room detail.

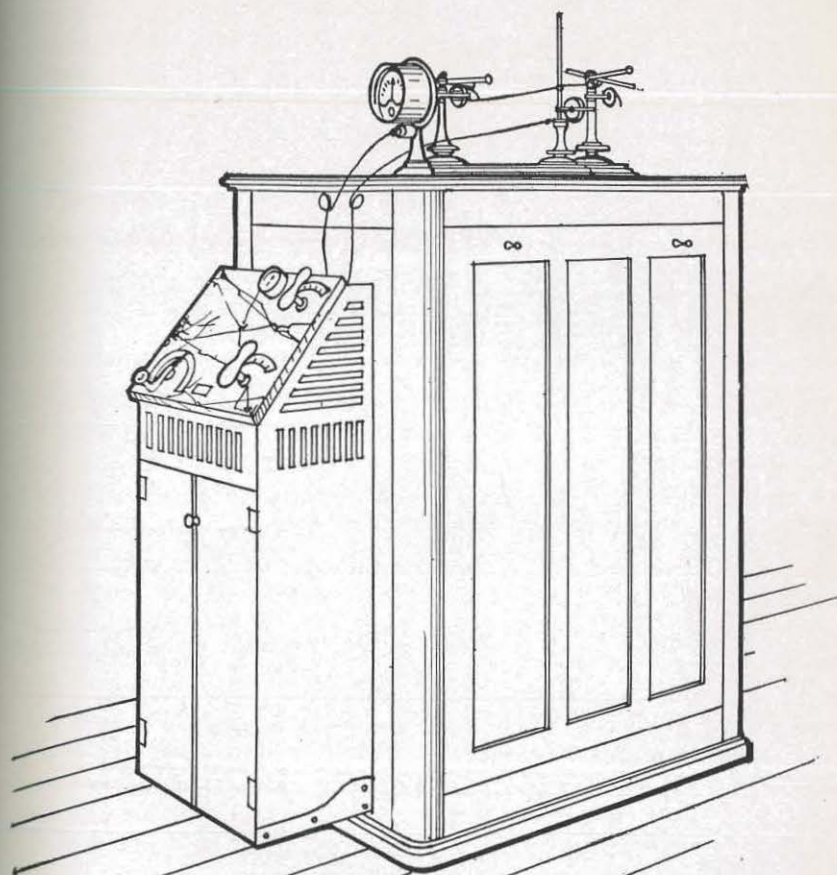
Wednesday:

Medical terminology.
 Posts, prefixes and suffixes.
 Word analysis.
 Taking of cultures and smears.
 Slide making and staining.
 Preparation of media.
 How to use the incubator.
 Blood technique.
 Sputum technique.
 Use and care of microscope.
 Microscopic examination of urine, blood, feces, etc., for common organisms, casts, etc.
 General urine technique.

DETAILS OF DUTY.

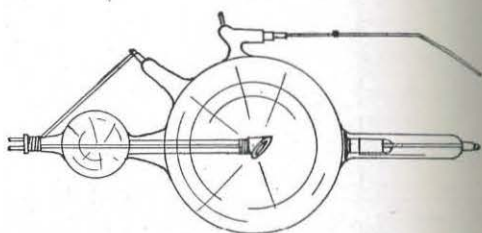
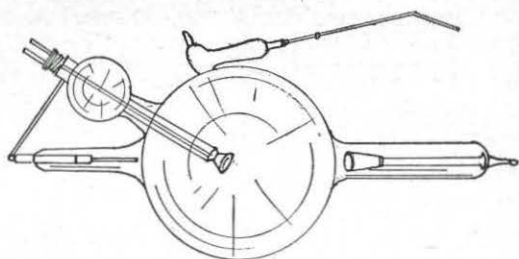
I have always been impressed with the fact that in developing a hospital corpsman we must not overlook the fact that in addition to being a good nurse he must also have petty officer qualities which will enable him to become a good handler of men. On a big ship like this where the work is very great it is particularly important. In order to arrive at this, we try to work our men up gradually. They are first started out as assistants in the general sick bay under the watchful eye of a more advanced man. When they have demonstrated their ability here they are given a small compartment to handle and then passed from one to another of these, including the surgeon's office, dental office, clerical office, dispensary, operating room, storerooms, and laboratory. In each of these compartments a man is at first an assistant. When he masters the duties he is placed in charge. Following this he becomes a section chief and has charge of all the storerooms and battle dressing stations; then in charge of the port section, which includes isolation ward, venereal treatment room, and bathroom; then in charge of starboard section, which includes operating room, dispensary, and clerical office, surgeon's office, and laboratory. Following this he becomes first assistant in sick bay, later in charge, and finally general department supervisor.

We have found that the above system works well under the most trying circumstances. We have been most successful in the development of an enthusiastic spirit; all of our men are good rooters for the *Mississippi* and its medical department. We are confident that anyone who receives a *Mississippi* graduate will have no cause to regret it.



ROENTGEN APPARATUS
— *COMPLETE* —

Supplement to Naval Medical Bulletin, October, 1919.



WATER COOLED TUNGSTEN TARGET
X-RAY TUBES

THE ROENTGEN-RAY TUBE; ITS CONSTRUCTION AND OPERATION.

By CLYDE E. SNIDER, Lieutenant, Medical Corps, United States Navy.

The Roentgen-ray tube is a thin-walled, highly evacuated glass bulb into which have been sealed the electrodes or terminals. Roentgen, when making his famous discovery in 1895, used a pear-shaped vacuum tube, a flat cathode mounted in the body of the bulb at its narrow end with the anode placed in a small side tube. A tube thus constructed gives a vivid fluorescence, but will not survive long exposures. Due to the large area of emission of the rays, the photographs were blurred and indistinct.

The impression prevailing in the earlier years was that active fluorescence was essential for the genesis of the X-rays. Various workers constructed tubes of fluorescent glass with the idea of enhancing the output of the tube. It has been established since that the fluorescence has no value in regard to the output of the X-rays.

Considerable improvement over the Roentgen type of tube was made by Campbell-Swinton in 1896 by inserting a sheet of platinum obliquely in the path of the cathode ray, but it still required undue length of exposures and the radiographs were lacking in detail. In the same year Jackson, of King's College, London, further improved the tube by replacing the flat cathode by a concave one. The use of the concave cathode was undoubtedly due to Sir William Crookes who, in 1874, had shown that a concave cathode would bring the cathode rays to a focus, and a few years later demonstrated the heating effects of the cathode rays by constructing a tube in which the rays were focused on a platinum plate.

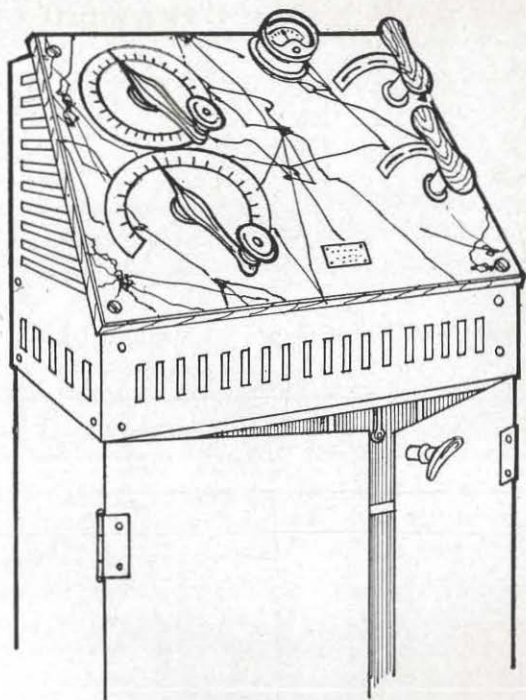
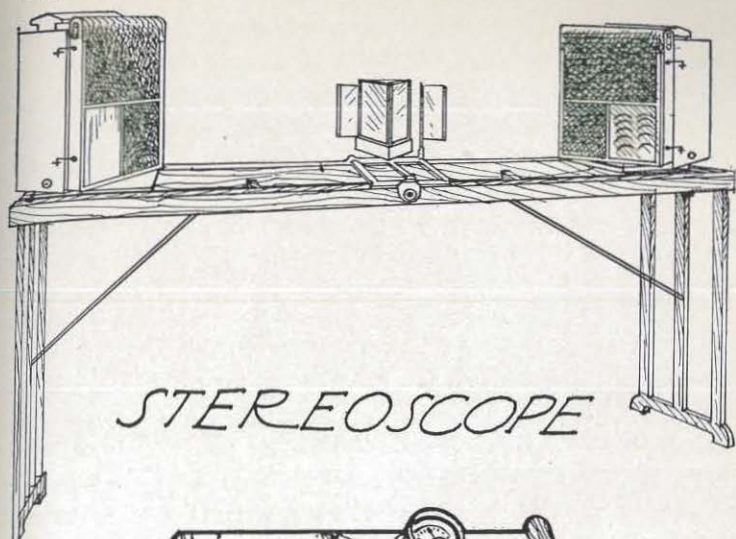
Jackson mounted the target at an angle of 45 degrees to the rays and in all essentials his tube agreed with that of Crookes. This focus tube worked beautifully and, due to the amount of X-rays generated and the small area of emission, the time of exposure was greatly reduced and the radiographs were wonderful in sharpness and detail. The design of X-ray tubes to-day agrees essentially with that of 15 years ago. The Coolidge tube is the only notable exception.

The electrodes of a Roentgen-ray tube are fastened to heavy wires and are mounted in side tubes projecting from the main bulb. The sheathing of the supporting wire with glass steadies the discharge to some extent. This partially obviates, especially at low pressures, the discharge from passing along the walls of the tube. It also checks "sputtering," which is pronounced with wires and points. The glass walls of the tube become negatively charged in the region of the cathode and positively charged in the main body of the tube. In a blackened tube these charges may cause the focal point to wander

and thus lead to sparking along the glass wall. An additional anode of aluminum finds its place in the modern tube. This is joined to the anticathode, externally, usually by a spiral wire. Its benefit is somewhat doubtful. Probably by electrostatic action, it is helpful in steadying the discharge. In working with coil discharges, there is always some inverse current present, and the additional anode is probably of some benefit under these circumstances. The auxiliary anode, rather than the anticathode tends to act as a temporary cathode, preventing to quite an extent the blackening of the walls of the tube. This is due to the fact that aluminum exhibits less cathodic sputtering than platinum.

Aluminum is used for making the cathode as it exhibits a minimum of cathodic sputtering although it is possible to make this element sputter appreciably as is quite evident on the examination of an old tube. A brown deposit can usually be found on the central area of the cathode as well as on the surrounding glass. The cathode in a focus tube is concave. The normal ejection of cathode rays holds for plain surfaces, but unless the pressure is not very low it does not hold for concave cathodes. As exhaustion proceeds the focus recedes farther from the cathode and may reach a distance of four or five times the radius of curvature of the cathode. Usually the distance between the cathode and anticathode is about three times the radius of the curvature. This distance should be governed by the hardness at which the tube is to be run. Earlier tubes were provided with a device to move the anticathode to suit the conditions of use. It has been found that an aluminum cathode faced with an electro-positive element, such as calcium, conduces to smooth running of the discharge, and such a cathode can be run with safety much harder than if made of plain aluminum. This is probably because metals emit electrons with comparative ease.

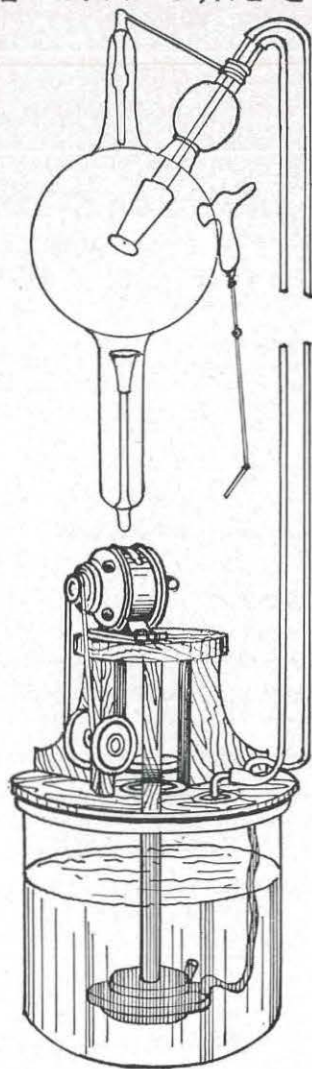
The material chosen for an anticathode, in order to meet the modern requirement, must possess certain physical properties in order that it may deliver the proper quantity and quality of X-rays and itself not be destroyed. To insure a large quantity of rays, experience has shown that high atomic weight of the anticathode is necessary. As the sharp focusing of the cathode rays on the anticathode subjects this element to intense heat, the anticathode must necessarily have a high melting point. It must conduct heat well in order to diminish local heating. A low vapor pressure at high temperature is necessary in order to avoid "sputtering." Such metals as platinum, iridium, tantalum and tungsten have been used as anticathodes. Tungsten answers the requirements as outlined above, better than any other element as yet used for the purpose and its use has become firmly established.



*DETAIL VIEW OF CONTROL
SWITCHBOARD, SHOWING AUTO-
TRANSFORMER DIAL AND LEVER
MOUNTED IN POSITION*

WATER COOLING SYSTEM

FOR USE WITH WATER COOLED TUBES



When a moving electric charge, such as is given off from the cathode in an X-ray tube, is suddenly stopped or the velocity suddenly changed, the energy is also changed and this sudden change of the velocity of the cathode rays give rise to X-rays. It then follows that the higher the speed imparted to the electron and the more effective the stop of the moving particles, the more penetrating are the resulting rays.

In a Roentgen-ray tube the degree of evacuation and the difference of potential applied to the terminals of the tube control the velocity of the electrons. The rate at which the electrons are stopped results from the velocity of the electrons and the material of which the anticathode is made. The quantity of rays may be measured in several ways:

1. By absorbing the radiation and finding the heat produced.
2. By its ionizing, chemical or photographic action. The effect of radiation from a tube is dependent, so far as radiography is concerned, on:

- (1) The current passing through the tube.
- (2) The voltage applied to the tube.
- (3) The time.
- (4) The distance.
- (5) Energy and temperature of the developer.

The character of the discharge obtained from the tube depends on two variable factors: The vacuum of the tube and the potential of the current delivered to the tube by the machine. Tubes are usually pumped to a slightly higher vacuum than is ultimately required. An auxiliary tube sealed to the main bulb and containing some substance which liberates gas when an electric current is passed through it is used to lower the vacuum of a gas tube. To raise the vacuum when it has become too low is quite a serious proposition, and for this reason a tube should never be lowered more than is actually required. The anticathode may also be overheated by excessive lowering of the vacuum and gases stored in the metal are liberated. Sometimes these gases are reabsorbed on cooling and again, under certain conditions, they are not reabsorbed, consequently the vacuum of the tube remains low due to the liberated gas. For this reason a tube should not be overheated.

IMPRESSIONS OF THE COURSE OF SPECIAL INSTRUCTION AT THE SCHOOL FOR NAVAL PHARMACISTS, HAMPTON ROADS, VA.

By N. L. SAUNDERS, Pharmacist, United States Navy.

Having had several years experience in the Hospital Corps and having studied along lines relative to my duties as a member thereof, I naturally had gained considerable knowledge of the sort required by naval pharmacists. But my studying had been poorly directed and the knowledge gained was almost without form and void of any special benefit as was proved conclusively during my attendance upon the above course. However, after 10 weeks of "cramming," excellent lectures, and practical laboratory work, all under the careful supervision of competent and willing instructors, this rudimentary knowledge has assumed such shape that I believe it is now a foundation on which to build, and, after long resting in semi-darkness has at last been brought to the doorways of light and will, I hope, be of lasting use to me in the future.

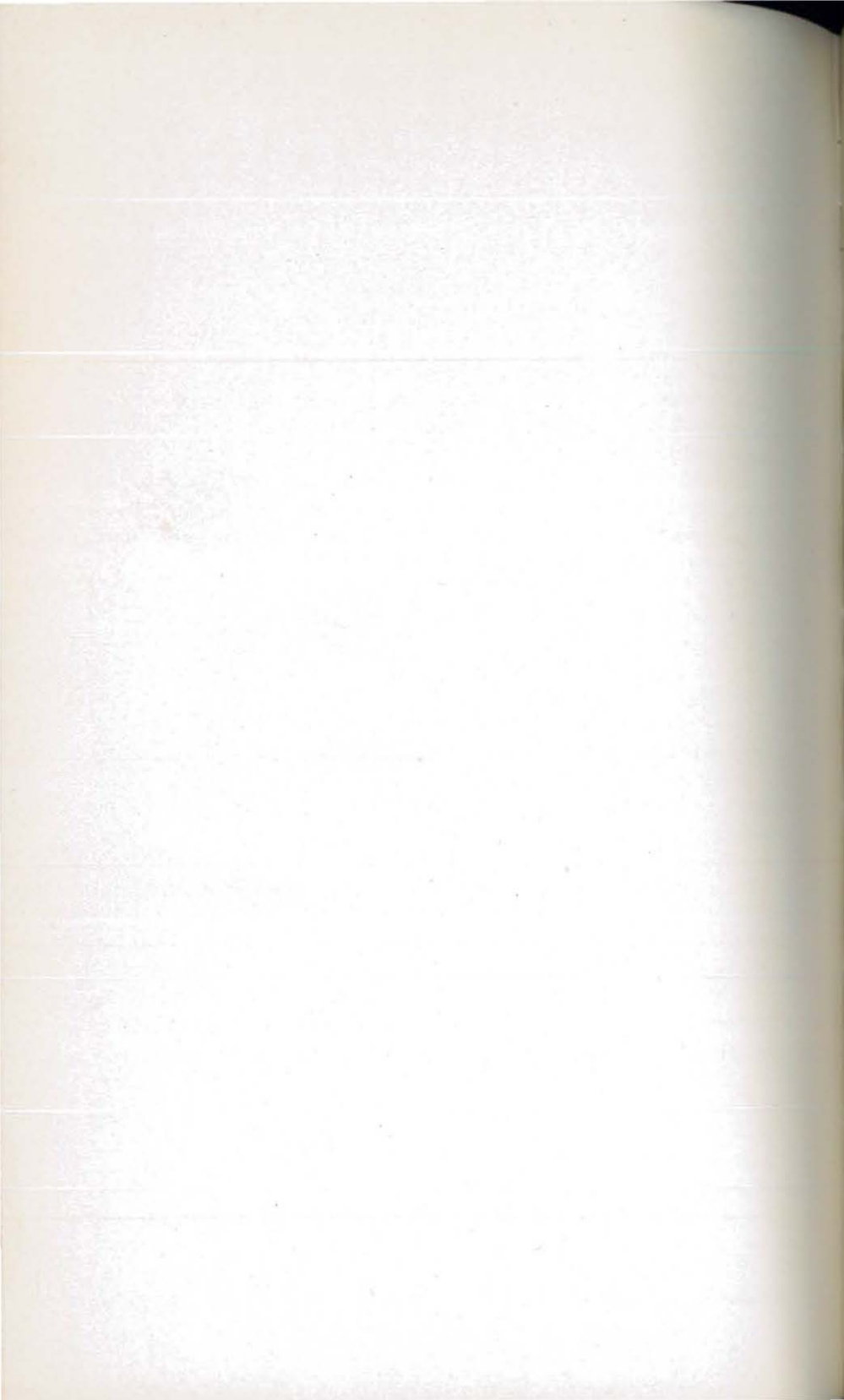
Whether this improvement will be evident to others is, of course, a question, but personally I know that I have gained immensely by having been permitted to attend this course of instruction and I herewith express to the entire staff of instructors my sincere appreciation of their efforts to bring me and my fellow students to a fuller understanding and conception of our duties as naval pharmacists, of our relation to the naval service at large, of the possibilities for expansion of our work along new lines as an integral part of the medical department of the Navy, and last, but by no means least, for teaching us how to study.

The writer was the first to report for temporary duty "in attendance upon a course of special instruction" and was very much at sea as to what to expect, and, I believe the staff of the school was in somewhat the same condition with regard to what subjects should comprise the course and how they should be given, for, after all, the course was an experiment in more ways than one. But for myself, and I believe I speak for the other members of the first class, I am very glad that someone thought of this experiment and decided to give it a trial.

However, the staff did not long remain "at sea," for with the reporting of the others it developed that we wanted (and most of us needed) all we could get out of the course. As a result, materia medica, pharmacy, chemistry, hygiene and sanitation, and dietetics were carefully studied, though all too quickly. Nevertheless, the cardinal points of each were brought out and clerical procedures, administration, commissary supervision, and X-ray theory were thoroughly dis-



PHARMACIST'S MATES SCHOOL, NAVAL OPERATING BASE, HAMPTON ROADS, VA.



cussed and lectured upon. The study of dietetics was especially interesting, as it took up the composition and caloric values of foods, the study of the digestive organs, and the processes of digestion and assimilation, and the care, preservation, and preparation of foods.

A schedule of 30 hours of lectures and laboratory work weekly, was prepared covering the above subjects, and in order to understand and grasp even a part of what the instructors were setting before us during these hours certainly required the burning of midnight oil for the necessary collateral reading. But if we, the students, worked, we were not alone, for I am positive that in order to deliver knowledge in the "tabloid" form required to cover the course outlined in the period of time allotted, special lectures had to be prepared, in order to bring out the essential points. As an example, all the animal products official in the United States Pharmacopœia were covered in one lecture of two hours' length—and there are 26 of these products.

Many of us have, in years gone by, attended one of the classes of instruction at Norfolk or Washington and have been benefited, for these classes were good, but, they were as different from the present Pharmacist's Mates' School at Hampton Roads as a common school is from a college. At Norfolk and Washington there were a few rooms assigned as dormitories and lecture rooms, with poor laboratory facilities, while at Hampton Roads there are new buildings equipped in a manner to make any of us proud to belong to the Hospital Corps and thus have the opportunity of becoming a student there.

In this school, with its modern chemical, pharmaceutical, bacteriological, dietetic, first-aid, clerical, and X-ray laboratories, its forge shop for the making of special splints, etc., its up-to-date medical library, its splendid museum, and its botanical garden, there are opportunities, such as many of us have long wished for. If one enters here with an open mind and determined to get all possible out of the work given in the necessarily limited time, then it seems, to me at least, that every pupil might become the naval pharmacist of "all-around ability with well-rounded knowledge" of our duties so that when sent to duty where it is impossible to follow our own special bent we will not be square pegs trying to fit into round holes.

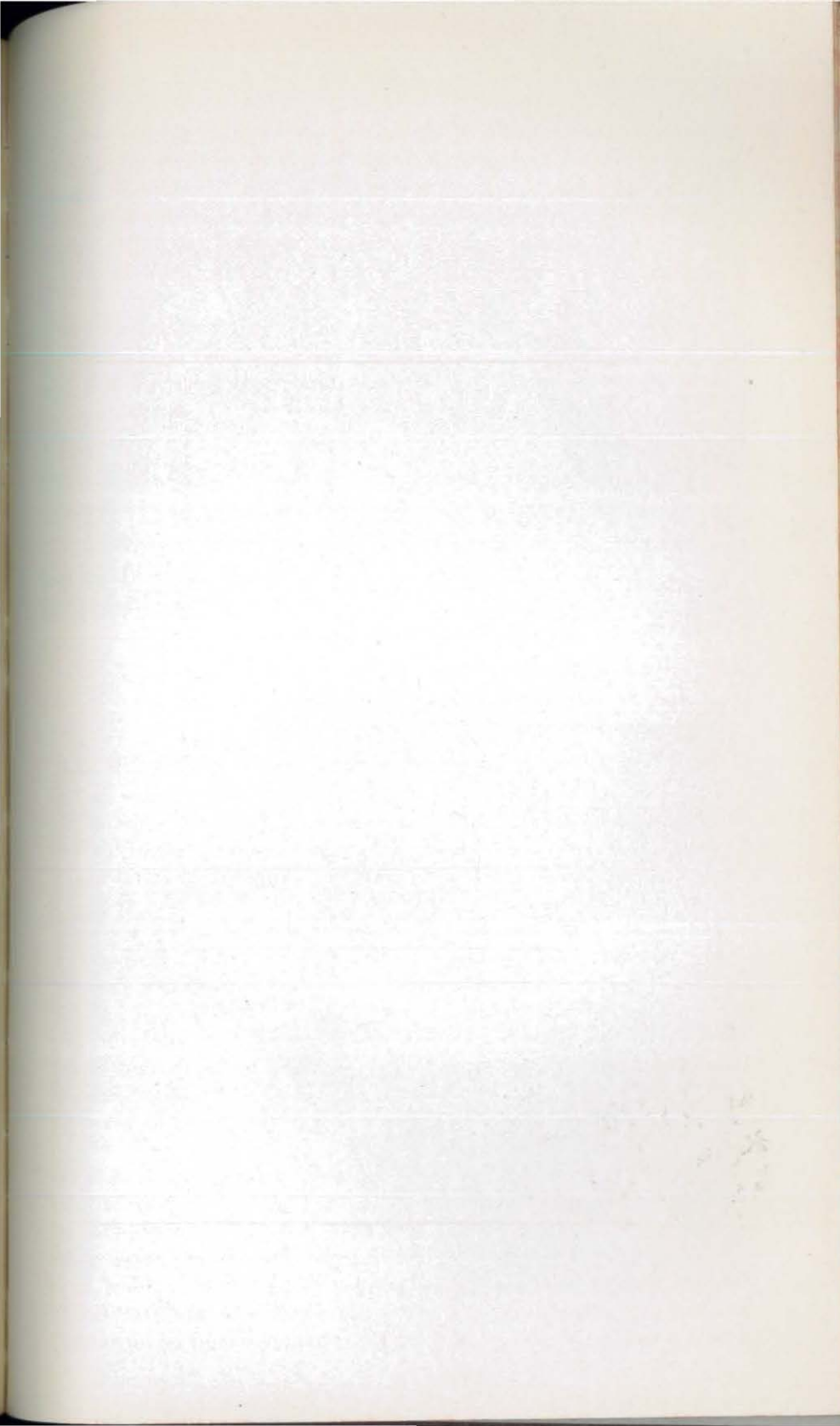
The day of the naval pharmacist specialist, assigned to duty as such, alone, because he is a specialist, has practically passed, and all must or should have that all-around ability which fits one for any or all of the varied duties now devolving upon us as office managers, X-ray technicians, physical and chemical analysts, property accountants, commissary supervisors, vital statisticians, Hospital-

Corps instructors, sanitary inspectors, et cetera, resulting from changes of station and alternation between duty on shore and at sea. While we may find ourselves fitted for some one line of duty which we are able to handle better than others and in which we take more interest, yet we should continue to keep a weather eye on the other lines, for none can tell when we may have to make good in one of them.

I believe this special course of instruction is a wonderful chance for those who desire to improve themselves in their profession, to broaden their understanding of their duties and thus add to their special knowledge and bring to their future service an enthusiasm, an energy and an ability greatly increased through contact with those having the opportunity for continual study and doing duty as instructors.

Many there are, no doubt, who never have had a real idea of what to study or how to study and as a result have drifted along with the tide, doing their duty well and efficiently but without the interest in their work and in study that shows visible results by promotion, due, in all probability, to not knowing how to go at it. But in this school studying is explained and systematized and haphazard methods are thrown aside and one is shown a way which leads to light and brings with it a lively interest in studying. It develops, gradually, that one can study without the consciousness of its being an effort, if one knows where and how to begin. I admit, frankly, that I was astonished at the numerous sidelights which can be brought to bear on the driest subjects and stimulate a desire for further investigation in them. No longer do materia medica and theoretical pharmacy (ordinarily two dry subjects) have their old-time terrors, for while it is necessary to delve and read in books other than the text alone, they now hold an interest of which I never before dreamed. And chemistry! During this course I learned that it was not merely a conglomerate mass of symbols, formulæ, theories, valencies, and atomic weights (which had always made me feel like throwing up the job), but that it was a science, real and vibrating with possibilities of the utmost interest. And its open and closed chain series! Why, oh why, didn't this course last long enough to give us a real friendship with organic chemistry instead of allowing us but the briefest introduction!

It is my hope some day to be able to again attend this or a similar course, and I believe that, if every five or six years during our service, we could spend at least three months in attendance on such a course and could have from eighteen months to three years assigned to duty at those special places, where now but a few have the chance of doing duty, and under the supervision and instruction of officers specially trained in these duties, there would be ultimately





GARBAGE-REMOVAL SYSTEM, GUAM, M. I.



METHOD OF OPERATING SANITARY GARBAGE BARRELS.

in the naval service a corps of expert naval pharmacists, which could (I but whisper this) gradually relieve the disciples of Æsculapius of the duties outside of their own profession, thus permitting the corps of naval pharmacists to be the actual and managing superintendents of our naval hospitals, responsible only to the commanding and executive officers.

SANITARY GARBAGE SYSTEM.

By H. W. ELLIOTT, Pharmacist United States Navy.

The accompanying plan and photographs represent a sanitary, economical, and convenient garbage system designed by me and constructed and installed at the United States Naval Hospital, Guam.

The temporary holding of garbage and kitchen refuse while awaiting removal is generally unsatisfactory. Even when the covered cans are used they are frequently placed in some out of the way corner, thus establishing a breeding place for flies and rats because the covers are often left off or the garbage is spilled while being deposited.

The suppression of the fly nuisance with its attendant dangers and the prevention of the scattering of putrescent material by rats, cats, dogs, and other animals are so important that any appliance suppressing or checking these conditions is worthy of consideration. We feel that this device will effectually prevent the above-mentioned nuisance. The system is constructed of angle iron, heavy enough to withstand rough usage. It consists of ordinary alcohol barrels set in iron cradles built of angle iron 2 by $\frac{1}{2}$ inch; a wooden box 24 by 24 by 8 inches, lead lined, secured to the floor; a 2-inch sewer pipe connection in the center for carrying away the liquid as it drains from the barrel above.

This system can be installed with very little expense at any naval hospital by hospital labor, and will answer the purpose better than any other system I have ever seen in operation. It can be installed near the galley on a porch or platform built for that purpose, inclosed with wire screen and fitted with suitable doors to prevent flies, insects, or animals from infesting the place.

This system has been in use at this hospital for at least six years, and during this time it has always been highly efficient. It has come to special notice of the medical officers who have observed its good qualities and frequently been highly spoken of by them. Judging that it might be of some interest to some of the readers of the Hospital Corps SUPPLEMENT, these plans and photographs have been submitted for publication.

A SICK BAY DE LUXE.

By A. J. HEUSCHLING, Pharmacist (T), United States Navy.

The U. S. S. *Imperator* was one of the German vessels laid up in Hamburg harbor during the war. She was so immersed in mud that a channel had to be dredged in order to bring her out. She was turned over to the United States Government to be used as a transport on May 5, 1919, and was commissioned the same day with Captain J. K. Robison, United States Navy, in command.

The sick bay on the first trip from Brest, France, to New York, consisted of fifty bunks on "G" deck forward and was formerly used for sick steerage passengers. There were also three rooms on "A" deck amidships formerly intended for first-class passengers but no use was made of them. To get an idea of the decks it should be remembered that on the *Imperator* the uppermost deck is "A" and the lowest deck "K".

Upon the ship's arrival in New York, on May 23, 1919, she was fitted with standees for troops, new mess halls, latrines, and bath rooms and a sick bay was constructed by navy yard workmen.

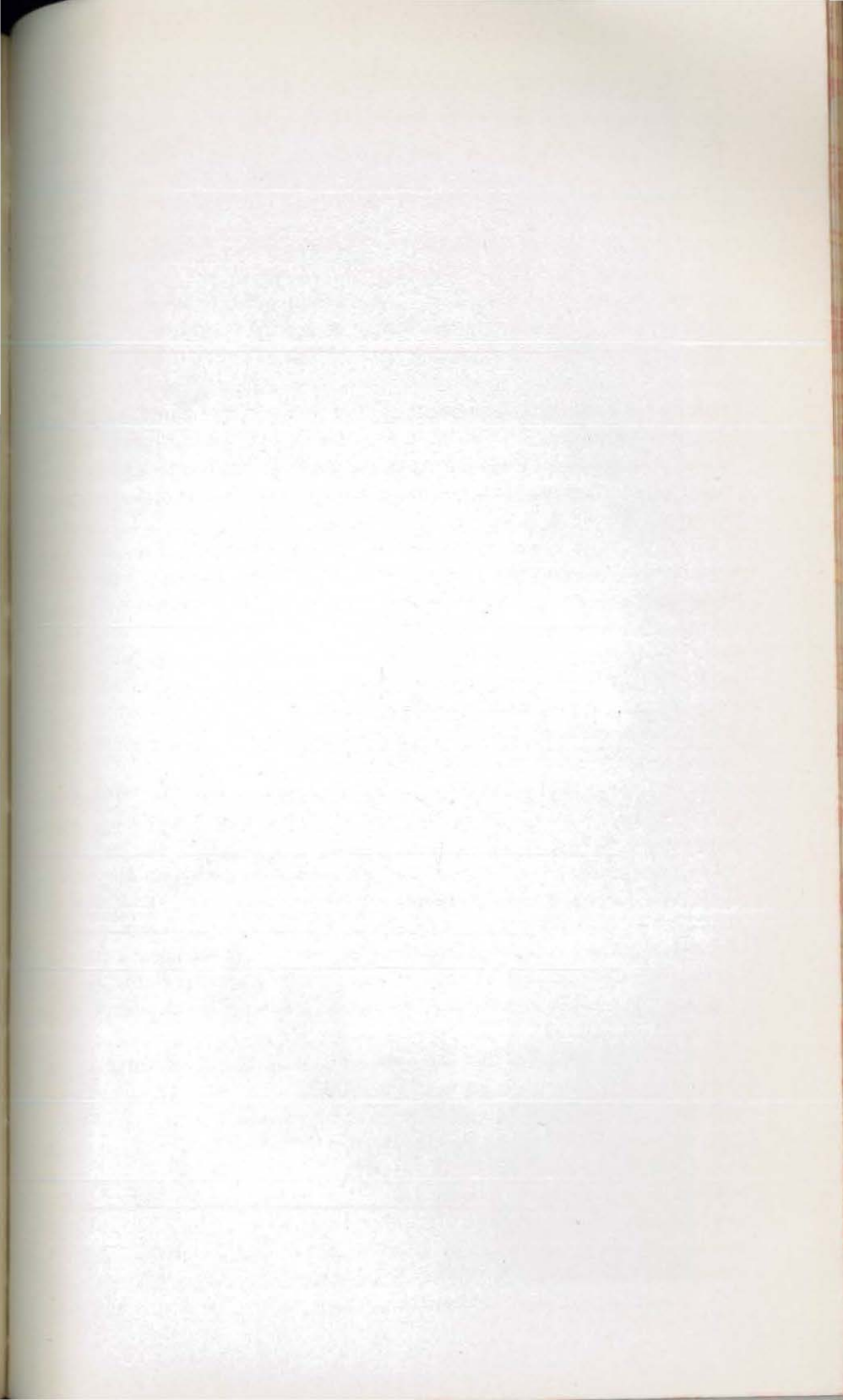
The sick bay was built on "D" deck aft and was formerly the social hall and smoking room for second-class passengers. There were two wards provided, a medical and a surgical. Six nurses were assigned to the *Imperator* for duty and 60 hospital corpsmen but only 35 were desired by the senior medical officer. This number has proved to be entirely adequate.

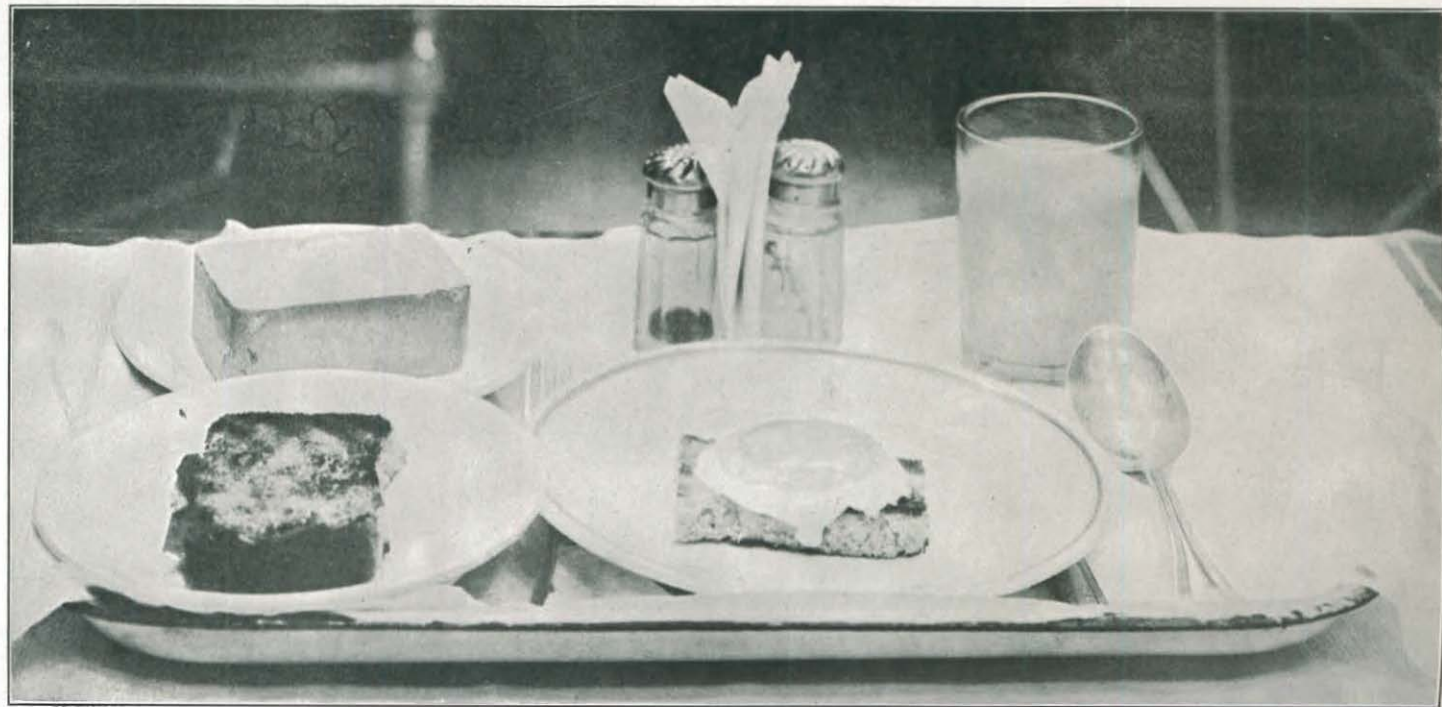
The medical ward consists of 80 bunks, has ample ventilation with 7 windows and a large skylight, which renders artificial light unnecessary during the day.

The color scheme of the medical ward is Nile green on the bulkheads and beaded white paneling on the ceiling. The deck of the medical ward is of concrete which has been shellacked. On the edge of the skylight are placed ferns, trailing ivy, and other potted plants, so that on entering the ward you are greeted by a veritable bower of potted flowers in full bloom which are renewed upon the vessel's arrival in New York.

Directly forward of the medical ward are the examining room and dispensary. With a crew of 2,300 men it is necessary to obtain rapidity in holding sick call and to this end four medical officers hold morning sick call at the same time. Sick call at 1 p. m. and 7 p. m. are held by the officer of the day.

When 10,000 troops are taken aboard at Brest the problem of their care becomes more complicated. For their sick call 12 substations are established in the troop compartments all over the ship. Twelve Army medical officers are assigned to these stations and treat all mild cases there. Hospital cases are transferred to the ship's hospital





A TEMPTING TRAY READY FOR THE WARD. ICE CREAM, TOAST, POACHED EGG AND MILK.

and thus pass under the care of the naval medical officers. Each substation is supplied with the ordinary medicines and dressings, all contained in a medicine chest.

Three isolation wards are arranged in a row on the port side of the medical ward, each containing eight bunks. They have the same color scheme as the medical ward as well as the same lighting and concrete deck.

The surgical ward consists of 80 bunks. The color scheme here is mahogany and white and the ventilation is the same as that of the medical ward. Electric candelabras furnish the artificial lighting. The surgical ward has a dressing table which can be readily moved about the ward. This ward has the same decorative scheme with flowers on top of lockers and around the skylight as the medical ward.

The operating room on the starboard side of the surgical ward is equipped with a standard United States Navy sterilizing outfit and operating room cabinet. It has a tile deck and is equipped with operating tables and ample light and water.

The dressing room for pus cases is located forward on "F" deck, has a tile deck and plenty of light and fresh water. The equipment consists of an operating table, electric sterilizer, and a full set of instruments.

The eye, ear, nose, and throat room is situated on "E" deck below the main sick bay and has all modern equipment. This room is also utilized for the examination of women passengers.

The genito-urinary room, located on "G" deck just below the dressing room, is outfitted with a cystoscope, urethroscope, and operating table and is also used for the administration of salvarsan.

The venereal treatment room is just aft of the genito-urinary room and all venereal prophylactics and venereal treatments are given there.

The diet kitchen is located on the port side of the surgical ward and is glass-enclosed. It is equipped with electric ovens and stoves and has a refrigerated ice box which is cooled by coils from the ice plant on board. Here the special diets are prepared. All patients' diets are placed on trays and served in the ward by the hospital corpsmen. The sample diet illustrated is as follows: Egg on toast, milk, ice cream, and dry toast.

Any diet can be readily prepared upon an order from the medical officer in charge of the ward. A nurse is in charge of the diet kitchen, assisted by two hospital corpsmen.

The outstanding feature of the *Imperator's* sick wards is the effective combination of artistic surroundings with an atmosphere of comfort. To obtain this the existing decorations of the two spaces allotted were disturbed as little as possible. The beautiful Nile green paneling on the bulkheads, the beaded white paneling overhead, and

all gilt moldings, bronze medallions, etc., were left in their original state. Three-pronged bronze candelabras are spaced generously on all sides of the wards, each holding an imitation electric candle of frosted glass.

The standee bunks when erected were finished in white enamel and this with the snowy white linen presents a pleasing contrast to the other colors. The light Nile green and white naturally suggest something of outdoors and to enhance this effect potted plants are utilized at every opportunity.

The surgical ward presents a marked contrast to the medical ward in its arrangement of colors. Here the room was originally finished in mahogany the wood being used in panels with a natural finish. The deck was covered with a heavy black-and-white-squared linoleum. In general appearance there is more solidity in this room than in the medical ward. Again all existing ornamentation and decoration was carefully left undisturbed and utilized to produce a peaceful and pleasing air. All bunks were finished in white enamel.

In addition to the decorations there was much beautiful furniture left that could be used for the various offices separated from the wards by colonial glass partitions. In the passageway between the two wards leather sofas were allowed to remain. The Red Cross supplied mission writing desks such as are used in hotels, enabling convalescent patients to enjoy the luxury of a modern club. This space is used as a lounging room.

What has been the result of this effort to produce something almost ultra-beautiful in the way of sick accommodations? Has it been of practical value? The members of the Hospital Corps of the *Imperator* think that it has. They saw a very poorly ventilated, poorly lighted, depressing sick bay abolished and a beautiful, airy space take its place through which the ocean breezes circulated almost as freely as though it were a garden by the sea. They witnessed trays being served from a diet kitchen equipped with electric stoves and coil-cooled ice boxes.

These trays were tastefully arranged by a nurse in spotless white and went from the diet kitchen into the wards, one perhaps to the bedside of a fireman third class, the other maybe to a lieutenant colonel of the Army medical corps, for although the Army officers traveling on board the *Imperator* have better rooms than on any other transport, they have invariably preferred to be treated in the sick bay when ill.

"Do you treat officers the same as enlisted men?" was a question asked the senior medical officer of the ship. "Most certainly not," was the reply; "we try to treat enlisted men the same as officers." In that phrase is expressed the standard of the medical department of

the *Imperator* which the Hospital Corps has tried hard and successfully to attain. When a man is sick he is a patient, a human being in distress, whether he be officer or enlisted man. In medical work there can be no other ideal.

NAVAL MEDICAL EXHIBIT—MEETING OF THE AMERICAN MEDICAL ASSOCIATION, ATLANTIC CITY, JUNE 9-13, 1919.

By J. T. CASSADY, Chief Pharmacist, United States Naval Reserve Force.

(Illustrations by J. T. Cassady.)

In response to a request of the American Medical Association for an exhibit illustrating the war activities and achievements of the medical department of the United States Navy, an exhibit was launched after a few weeks of careful planning, the magnitude of which was due to the splendid cooperation of all the Navy units which contributed. And it was a success from the first note blown on the Navy band cornet to the final cutting away of the last strip of bunting and the bidding of adieu to Atlantic City.

The exhibit was most timely and appropriate, following as it did close after the Great War, when all dates, notes, writings, statistics, and numerous scientific devices and improvements brought about and accomplished by Mother Necessity were fresh with professional interest. It may be said that this exhibit was the largest, embodying the most scientific and spectacular display of its activities, that the medical department of the United States Navy has ever presented to the medical profession and the public.

The exhibit was staged in the exposition building, a large structure situated on the boardwalk in the immediate center of all the main attractions, and adjacent to the larger piers.

A working party was sent down a few days ahead of the opening date to rig aloft the many flags, national and signal, and the numerous code and call pennants; to set up the illuminating gear which was to accommodate the hundreds of colored electric lamps; and to run the long stretch of white fence encompassing the booths.

Two days before the exhibit opened all hands were on the job. Shipments arrived in due time and every man was a live wire from the fifth minute after he drained his coffee cup in the morning until the stubby hand of the register of time signaled midnight, and a watch was posted.

Monday morning, June 9, found the exhibit set up, everything in order and adjusted to a nicety. Upon the arrival of the Navy band of 23 bluejackets from the Philadelphia Navy Yard, a peppery jazz opened the program, and the show was on.

ENTRANCE TO EXHIBIT.

Approaching the Navy exhibit one was impressed, as one of the visitors puts it, "with an inviting picture of welcome, charm, and freshness." This pleasing aspect was heightened by the numerous colored lights and flags and by the great stretch of artistic white fence encircling the entire exhibit. Over the main entrance, suspended by an invisible wire, was a characteristic Navy device, of crossed fouled anchors, surmounted by a colored shield and five-foot spread-eagle done in natural colors.

Each particular class of exhibit or activity was assigned to its respective booth, to permit of a complete and uninterrupted study.

MODELS OF SHIPS.

The models of three ships, *McCall*, *Constitution* (*Old Ironsides*), and the battleship *Wyoming* were placed at the main entrance, affording a pleasing and appropriate introduction to the exhibit and simultaneously demonstrating the great strides in naval architecture and the corresponding development in the medical department of the Navy to cope with every emergency that service conditions might bring about in time of war or peace.

MEDICAL DEPARTMENT OF THE U. S. S. "IDAHO."

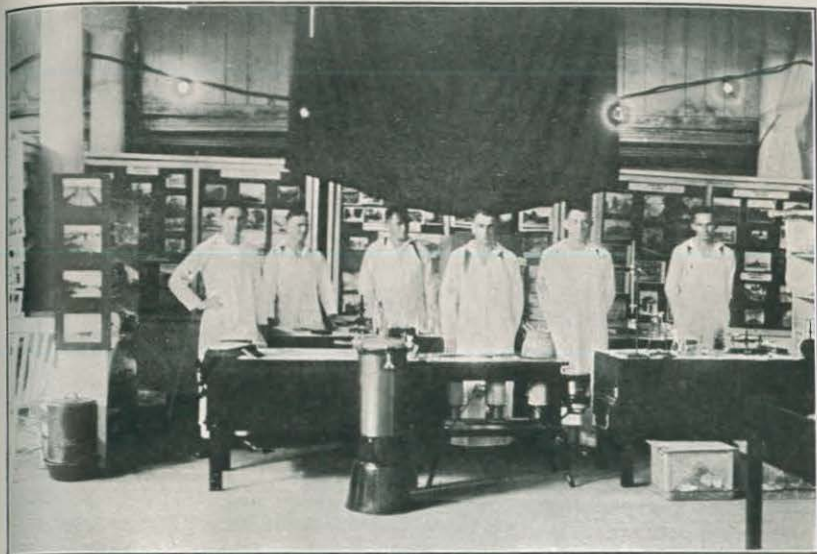
To further illustrate the great facilities and splendid equipment now available on board ship to assist in guarding the health of the Navy personnel, an exact reproduction in miniature of the medical department of the U. S. S. *Idaho* was shown in a striking model, on a scale of 1 inch to the foot. The model measured about 40 square feet.

Going over the neat and attractive miniature furnishings of the different compartments of the *Idaho*, starting on the starboard side and going forward, we have the dental office with its dental cabinet, instrument locker, flat-top desk, lavatory, dental chair, and all the accessories, from the swivel foot rest to the small cuspidor attached to the left arm rest of the chair.

Forward of the dental office came the surgeon's examining room with its transom, wardrobe, lavatory, two filing cabinets, instrument locker, and flat-top desk.

Then was shown the model dispensary with drug counter, cabinets, flat-top typewriter desk, poison and liquor locker, brass sections of detachable bottle racks, sink and enameled drain board, even to the nickel-plated rimmed mirror over the sink.

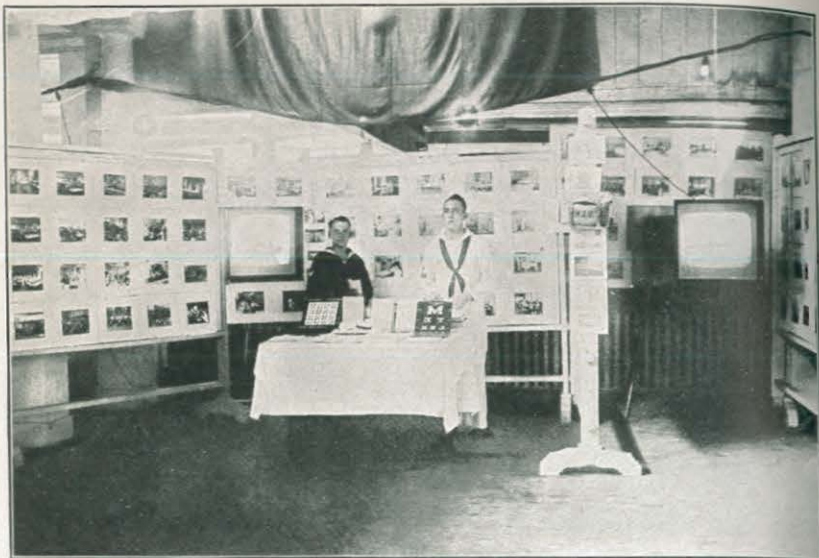
The operating room was fully equipped, with its miniature furniture showing the latest type of operating table, surgeon's stool, elec-



MOBILE LABORATORY UNIT FROM THE U. S. NAVAL MEDICAL SCHOOL,
WASHINGTON, D. C.



MAIN ENTRANCE TO THE NAVY MEDICAL EXHIBIT.



HOSPITAL CORPS EXHIBIT.



MEDICAL DEPARTMENT OUTFIT FOR SERVICE WITH U. S. MARINE CORPS.

tric sterilizers for instruments, dressings, and utensils. Water sterilizers for hot and cold water, with steam attachment, instrument stand, instrument cabinet, lavatory, three bulkhead wash-hand bowls, three large irrigating bottles, and their rack were all in place. On entering the operating room, and immediately to the left between the bulkhead and the 5-inch projectile hoist was a bacteriological outfit with incubator and accessories.

Next came the sick bay with 24 double-deck standee bunks arranged in one row close to the forward bulkhead and occupying the entire space athwartship, all bunks heading fore and aft. The dressing of these bunks with mattresses and pillows of gauze with a cotton filling enhanced the beauty of the whole model, adding a tone of cheer and restfulness. There were lockers for food trays, invalids' clothes, sick-bay linen, vision test set, and special dishes. A lavatory and flat-top desk completed the furnishings.

On the port side going aft we came to the venereal prophylaxis room, well situated, obviating all chances of those taking prophylactic treatment coming in contact or interfering with the treatment of other patients, and so admirably placed as to be under the immediate eye of the medical officer at all times. A miniature model of the regulation four-basin venereal-dressing stand was shown; sink with hot and cold water attachment; metal shelves for accommodating dressings and special articles.

Proceeding aft we came to the bathroom with its tub and shower, toilet, sink, white-enameled clothes basket, wash-hand stand, and mirror. A large cleaning-gear locker led off from the bathroom to accommodate the hanging up of deck swabs and hand mops, stowing of pans and buckets.

The isolation ward had four bunks, large locker for patient's clothes, two large drop metal shelves, drop metal desk, lavatory, and its separate toilet and bath.

The model of the medical department of the *Idaho* was extremely attractive to all visitors.

The actual equipment which is installed in all first-line battleships, from the portable sterilizer to the latest type of operating table and electric sterilizers; surgical instruments and appliances, from the pocket case to the magnificent surgical-instrument cabinet of the battleship, were on exhibition.

TRAINING STATION, GREAT LAKES.

The medical department of the Naval Training Station, Great Lakes, Ill., was represented by two fine models, one of a regimental dispensary, measuring 2 feet wide and 10 feet long, showing the receiving room, dispensary, genito-urinary ward, hospital corpsmen's

quarters, diet kitchen, medical officer's room, officer of the day's room, and dental office. All rooms were equipped with a full set of miniature furniture, tables, chairs, desks, bureaus, bedsteads and other articles, even to the radiators, which were set up with piping and the cowl accommodated in the roof.

The other model from Great Lakes was a regimental isolation cubicle building. This model measured about 4 by 5 feet. The building is divided into six wards, two large wards accommodating eight beds each and four smaller wards with four beds each.

All wards and attendants' rooms are entirely separated from each other and each is equipped with separate shower bath and toilet. The approach to all wards is from the outside through a fly-screened veranda. Glass partitions divide all wards and rooms, affording a full view of every part of the interior from the nurse's room. All wards in this model were fully equipped with neat and well constructed furniture in miniature.

These models represented the highly satisfactory type of buildings adopted by the Navy for its many training stations during the war. A handsome mechanical drawing of the Great Lakes Training Station, measuring 4 by 8 feet, was also shown. All medical department buildings in the drawing were shaded to show their exact location at a glance. Other excellent drawings illustrated the water filter plant, section of sewage disposal plant, garbage-can storage building, situation of latrines in two-story regimental barracks, model arrangement of bed-side sneeze curtains and other sanitary features at the Great Lakes Training Station.

IDENTIFICATION DIVISION.

The identification division of the Bureau of Navigation furnished a very interesting display, illustrating the method of taking finger prints, their classification and the bureau's infallible system of filing for ready reference. The technique involved in the etching of the Monel metal tag and the important part it played in identifying the dead during the war, particularly the drowned recovered long after submarine attack, was interestingly explained.

Photographs were shown in which there was a striking similarity of features, full, three-quarter and profile, of different men, in which finger prints have aided in proving identity.

Copies of passports, showing methods of preparation, with photographs and finger prints were explained.

Index fingers representing cases in which identification was established by securing the finger and restoring the cuticle through chemical treatment so that a finger print could be made, were demonstrated.



GENERAL VIEW OF REAR END OF NAVY EXHIBIT.



PHOTOGRAPHS.

Twenty large screens, each with a display area on either side of 4 by 8 feet, were used to show photographs, picturing every phase of activity in the medical department of the Navy and the general service. Interesting views were shown of naval hospitals in the United States and the island possessions, as well as hospitals constructed during the war at Strathpeffer, Scotland; Queenstown, Ireland; London, England, and Brest, France. An arrangement of photographs was made to demonstrate the general welfare of patients in naval hospitals and on board naval hospital ships; methods of subsistence; transportation; operating room and laboratory technique; nursing of medical and surgical cases; treatment of communicable diseases and methods used to prevent cross infection.

Another interesting display was the presentation of lantern slides by means of a specially constructed kiosk, triangular in shape, and illuminated from the inside. Each side of the kiosk accommodated 46 slides and legends, illustrating the method of social hygiene instruction in the Navy. These slides were loaned by the new sixth division of the Bureau of Navigation.

HOSPITAL CORPS.

The activities of the Naval Hospital Corps were indicated by numerous pictures and explained in talks delivered by hospital corpsmen in charge of the booth, who described the splendid facilities afforded for the instruction of these men in pharmacy, sanitation, nursing, laboratory, and operating-room technique.

Transportation of the sick and wounded by Army stretcher, Navy litter, boat, ambulance, sea sled, airplane, and individual carriers in the field were fully demonstrated.

Three stereomotographs displayed pictures illustrating activities of hospital corpsmen and the training of the bluejacket ashore and afloat, along with numerous pictures of ships of the old and new Navy.

DIVISION OF PREVENTIVE MEDICINE.

The division of preventive medicine of the Bureau of Medicine and Surgery displayed elaborate charts, showing the methods used by the Bureau for observing and guarding the health of the Navy personnel, which proved so essential during the war in keeping every training camp and station at a high point of efficiency. Statistics for the study and comparison of communicable-disease rates were presented by means of graphic charts in colors, colored spot charts and pin maps.

MOBILE LABORATORY UNIT.

A complete and fully equipped mobile laboratory unit with cages of rabbits, guinea pigs, and white rats was in operation. The preparation of culture media, taking of blood smears, and making of blood counts, the staining, fixing, and mounting of slides, and the identification of meningococci, diphtheria, and tubercle bacilli were demonstrated, including methods in specific therapy as used in the Navy.

MARINE BARRACKS, QUANTICO, VA.

The marine barracks at Quantico, Va., furnished a splendid exhibit, illustrating the activities of the Medical Corps and Hospital Corps, showing the methods adopted for guarding the health and fitness of marines at home and in the trenches of France, during the war. There was an artistic model of the Quantico Reservation, measuring $3\frac{1}{2}$ by 6 feet, showing the barracks, town, roads, streams, and the famous trestle bridge across the river.

Another model, measuring 5 by 7 feet, which greatly interested the visitors was that of a trench system, with its field sanitary appliances. This model was an exact reproduction of the trenches at Quantico in which the hospital corpsmen received their field training before accompanying the marines overseas.

Models of different types of ovens, field ranges, incinerators, urinals, and latrines were shown. Other models were of field water-filters, field shower-baths, and the Serbian barrel. Devices employed for oiling ponds and streams in the control of mosquito-breeding areas were also exhibited. A most successful type of submarine saw (Ziensen's) for eradicating aquatic plants was shown. Six different models of fly traps were on display. A beautiful collection of insects, caught and mounted on the reservation made an attractive exhibit.

Numerous charts illustrating the degrees of pes cavus and pes planus, and the points to be considered in measuring flat feet were presented and the method of fitting shoes in the Marine Corps was demonstrated.

Six styles of shoe worn by marines, along with foot-measuring machines and fitting devices were shown.

U. S. S. "LEVIATHAN."

A diagrammatic cross-section model of the U. S. S. *Leviathan*, measuring 7 by 6 by 9 feet, illustrated the berthing, messing, and washing facilities which were installed to accommodate the 10,000 troops carried each trip. The system of ventilating and lighting was handsomely presented in working miniature.

The everwarm nonsinkable suit carried by all transports for helpless patients in case of submarine attack caused favorable comment.

MOVING-PICTURE PROGRAM.

A moving-picture program was presented each day, illustrating the training of bluejackets and marines ashore and afloat, the activities of the cruiser and transport force, naval aviation, submarine chasers, the life of a man-o'-warman, and life and work in the fleet.

ELECTION OF ADMIRAL W. C. BRAISTED, UNITED STATES NAVY.

The election of Admiral W. C. Braisted, Surgeon General of the Navy, to the presidency of the American Medical Association on the afternoon of June 12, 1919, was very pleasing to the hospital corpsmen and the men of other ratings who had worked so earnestly in setting up and demonstrating the exhibit.

CLIPPINGS.

THE ART OF MAKING GOOD SUPPOSITORIES.

The manufacture of suppositories by the pharmacist is often attended by much unnecessary work and at times results in failure, because the important little details, the "small things," are either overlooked or else the operator has no knowledge of them. To relieve this situation the following information is given:

First of all the best general base for suppositories is cacao butter (oleum theobromatis U. S. P.), although the glycerinated gelatin (gelatinum glycerinatum U. S. P.) is preferred in several instances and with advantage. There are three methods for making suppositories, namely: The cold process, the warm process, and machine compression.

THE COLD PROCESS.

Whenever the nature of the ingredients in a formula for suppositories will permit, the cold process should be selected as it will yield the best results for general extemporaneous prescription work.

The cacao butter, when used in the cold process, should be grated and it is advisable to keep a fair supply of the grated product on hand at all times. It should first be thoroughly chilled by placing it on ice and then rubbed on an ordinary grater, protecting the part held in the hand with a piece of waxed paper to prevent it from soiling the hand. This grated product is to be preserved in a wide-mouthed bottle and in a cool place.

The use of grated cacao butter renders manipulation of the suppository mass easy, producing a much better working mass than when pieces of the cacao butter are crushed in the mortar. The process simply consists of mixing the various medicinal ingredients with the grated product in much the same way as in making a pill mass, employing the same kneading process as there used.

If, owing to the nature of any of the ingredients of the suppository to be made, the mass in the mortar should remain powdery or crumbly, a few drops of oil of sweet almond, castor oil, or glycerin, should be worked into the mass. This will remedy the difficulty and make the mass cohesive. About one-half drop for each suppository is usually sufficient. Petrolatum is also a good softener.

When the mass is completed it is to be transferred to the pill tile and worked into a cylindrical form (pipe), either with the hands or with a broad, short spatula, a putty knife answering the purpose admirably. Use either starch, talc, or lycopodium as a dusting powder.

The use of the hands is to be avoided as much as possible in the manipulation of the mass, as their warmth has a melting effect upon it, making it too soft to work well, as well as being very untidy. A few attempts with the spatula will generally result in making the operator an expert at the process, without any use of the hands whatever. The work should be carried on as rapidly as possible after the mass is formed, as a better suppository will then result.

The pipe is now to be divided into the required number of pieces, and each piece is molded into a cone-shaped suppository, using the spatula only, rolling the piece back and forth until the desired shape is obtained. This is best accomplished by placing each piece while being rolled just at the edge of the pill tile. The hands should not be used in shaping the suppository unless absolutely necessary, as it is difficult to secure uniformity and perfect smoothness in this way.

THE WARM PROCESS.

The only desirable manner of making suppositories with the aid of heat is as follows: Melt about three-fourths of the amount of cacao butter to be used in a small capsule or casserole, care being used not to get it too hot. The medicinal ingredients are then thoroughly incorporated with the remaining one-fourth of the cacao butter, grated, as in the cold process. This mixture is then added to the melted cacao butter and well stirred; on the careful preparation of this mixture depends the success of the method.

The capsule containing the melted cacao butter should be removed from the source of heat and its contents allowed to cool to about 96 F., which temperature may be approximately determined by

holding the capsule in the hand; it should not be in the least hot. When the two portions are mixed they should be stirred with a spatula or glass rod, according to the nature of the ingredients, until the mixture is liquid and homogeneous, and when the congealing point has almost been reached the fluid is poured into the molds, which have been first thoroughly chilled.

Should the mass in the vessel congeal, thus preventing its being poured, additional heat should be cautiously applied to the vessel. Overheating is to be avoided in all cases as perfect suppositories can only be obtained when the fluid is near the congealing point while it is being poured into the molds.

All molds should be perfectly clean, and if desired, they may be sprinkled with lycopodium or tale on the inside. The use of the smallest possible dish to contain the entire amount of the mixture is advisable, thus reducing loss to a minimum, and insuring that the last mold will be completely filled.

In the absence of ice for chilling the molds, and when haste is essential, the molds may be sprayed with ether or chloroform. This quickly chills them as effectively as does ice. The salt method of obtaining a cold temperature can also be used in the absence of ice, and ammonium chloride offers a most economical means in this respect. For the ordinary mold dish (for making 12 suppositories) use 2 ounces of ammonium chloride and water enough nearly to fill the dish; stir well; put molds in place; and they will be quickly chilled.

GLYCERIN SUPPOSITORIES.

The only suppository official is the glycerin suppository (suppositoria glycerini U. S. P.). There is no good reason why this suppository should not be made by the pharmacist, as the official process yields a very satisfactory product which keeps well and there is a large demand for this product in most localities.

The quantities given in the Pharmacopœia are sufficient for 10 rectal suppositories and these are made at a cost of 4 cents. Making 100 at a time the cost is 24 cents. The cost for bottles, corks, labels, heat, etc., is about 18 cents for each 100 suppositories, placing one dozen in a bottle. Thus the price per dozen bottles is about 60 cents.

GLYCERINATED GELATIN.

This preparation is official under the name of *gelatinum glycerinatum* U. S. P. It has little medicinal value of itself, but is a valuable vehicle for certain drugs in the preparation of suppositories, bougies, and so on. When suppositories are to be prepared with this agent, proceed as follows:

If the medicinal substance used is a solid and soluble in water or glycerin, such as boric acid, lead acetate, and the like, mix it first with a little water (from 10 to 25 per cent), then add a sufficient quantity of glycerin to make the weight of the mixture equal to one-half of the weight of the finished mass. If the medicinal substance is a miscible liquid, the same method is pursued as in the case of a soluble solid.

The mixture is now thoroughly incorporated with an equal weight of melted glycerinated gelatin and at once poured into suitable molds. If the mass is very thick, the molds should be warmed somewhat and also greased with a small quantity of petrolatum; this will facilitate the proper filling of the mold, but before removing the finished suppositories the molds should be well cooled.

With insoluble powders, such as iodoform, lead oxide and carbonate, and such, it is not necessary to add water, but enough of glycerin should be added to the powder to make the mixture weigh one-half of the total.

Often physicians will complain of the irritating action of the glycerin in these suppositories, and this can, as a rule, be prevented by replacing all, or nearly all, of the glycerin with water. The proportion in the finished mass would be: Gelatin, 25; glycerin, 25; water, 50; whereas ordinarily it is: Gelatin, 25; glycerin, 75.

In the case of such drugs as alum, tannic acid, and the like, no water should be used, as this would tend to make the suppositories hard and less soluble, owing to the action of these drugs on the gelatin. Cacao butter is to be preferred as a base for these drugs at all times.

When dispensing suppositories made with glycerinated gelatin it would be proper to advise the user of them to dip the suppository in water before inserting it. This overcomes the tendency to "stick" to the surface to which it is applied. They should be stored in a cool, dry place. A notice on the box giving these two last-mentioned causes would be in order to insure their being complied with. (N. A. R. D. Journal, Mar. 20, 1919.)

THE BACTERIOLOGICAL BALL.

A gay bacillus to gain her glory,
Once gave a ball in a laboratory.
The fête took place on a cover glass,
Where vulgar germs could not harass.
None but the cultured ones were invited,
For microbe chicks are well united;
They closely shut the ballroom doors,
To all the germs containing spores.

The staphylococci first arrived,
 To stand in groups they all contrived.
 The diplococci came in view,
 A trifle late, and two by two.
 The streptococci took great pains,
 To seat themselves in graceful chains;
 The penumococci, stern and haughty,
 Declared the gonococci naughty;
 And said they would not come at all,
 If the gonos were present at the ball.

The fête began and the mirth ran high,
 With not a fear of danger nigh.
 Each germ enjoyed himself that night,
 Without a fear of a phagocyte;
 'Twas getting late and some were loaded,
 When BANG! the formaldehyde exploded;
 And drenched the happy dancing mass
 That swarmed the fated cover glass.
 Not one survived, but perished all,
 At that bacteriological ball.

(Jour. Am. Med. Assn.)

HOSPITAL CORPS NEWS.

The second unit of hospital corpsmen who were given an intensive course of training at the Philadelphia College of Pharmacy received their certificates of training at the commencement exercises on Wednesday, June 4, 1919. These men, who have been especially trained along pharmaceutical lines, were transferred for duty to the various naval hospitals and Hospital Corps schools in the United States. The following letters are self-explanatory:

Letter from E. Fullerton Cook, director of the naval course, Philadelphia College of Pharmacy, to the Bureau of Medicine and Surgery:

I inclose a copy of the commencement program of the Philadelphia College of Pharmacy, where the certificates were presented to the second unit of hospital corpsmen training in the college.

This group of students has shown unusual interest in the course, and I trust will be of far greater efficiency in the service because of the training received here.

The board of trustees and the faculty desire to express their gratification that they were able to be of this small service to the Navy and the country.

Letter from the Surgeon General United States Navy to the trustees and faculty of the Philadelphia College of Pharmacy:

The second unit of naval hospital corpsmen to be trained at the Philadelphia College of Pharmacy having completed their course of instruction, the Bureau of Medicine and Surgery desires at this time to express its appreciation of the valuable assistance which the College of Pharmacy has rendered and the cordial cooperation of the faculty with this department of the Navy.

The names of the hospital corpsmen who received certificates of training follow:

Barker, Ernest Milton.
Brandt, Frederick Eugene.
Carlisle, John Edward.
Daube, Charles Frederick W.
Gilson, Howard Burbank.
Hale, Will Norris.
Hunt, Jesse Hamblet.
Jones, John Edmund.
Kyner, John Harvey.
Lee, Vernon.
Morris, Herbert Reed.
Nevans, David Harold.

O'Neill, Charles Henry.
Rathke, Arnold Leander.
Ryan, Charles Augusta.
Sheppard, Allen Charles.
Shytles, Harrie Marcellus.
Stovel, George Reynolds.
Sturgill, Virgle Leon.
Taylor, Alfred Vernon.
Traeder, Will Melrose.
Waitman, Bryan Jennings.
Wersen, Harold Edward.

Present status of the Hospital Corps.—By the time this appears in print the demobilization of hospital corpsmen, who are eligible for release under the provisions of the naval appropriation bill which recently passed, will have been practically completed.

To meet war conditions the Hospital Corps expanded from a total force of 1,600 men in 1916 to a total of about 16,000 in 1918, a thousand per cent increase. Since January, 1919, to the time of this writing, about 5,000 men have been released from the corps and larger quotas are being released each month.

The following tabulation made on July 1, 1919, shows the size and distribution of the Hospital Corps at that time:

Total number of enlisted men in Hospital Corps.....	11,125
Total number enlisted between February 3 and November 18, 1918 (eligible for release as "period of war" men).....	6,628
Total number of hospital corpsmen, United States Naval Reserve Force..	3,058
Total eligible for release.....	9,686
Remaining, not eligible for release.....	1,439
First enlistments since January 1, 1919.....	1,101

The above tables do not include pharmacists, of whom over 200 have been appointed from the enlisted members of the Hospital Corps.

The distribution of the Hospital Corps on July 1, 1919, was approximately as follows:

On transports.....	2,426
On destroyers.....	200
On battleships, etc.....	1,256

On foreign stations.....	700
Attached to hospitals in United States.....	2,400
At receiving ships.....	300
At Hospital Corps Training Schools.....	800
At miscellaneous stations.....	3,043

A glance at the foregoing tables will show that unless a large number of men eligible for release elect to remain in the service by reenlistment, or continuation of enlistment, the Hospital Corps will be wiped out, except for about 1,000 inexperienced men and about 300 trained hospital corpsmen.

It is hoped that the liberal provisions recently made by the Navy Department, which give all "period of war" men the opportunity to extend their enlistments for periods of one, two, three, or four years, with all the benefits and privileges of a man who has served the full four-year enlistment, including leave upon extension, and permit any member of the United States Naval Reserve Force to reenlist for two, three, or four years, with all the benefits and privileges allowed to regular service men reenlisting after four years' service, will induce large numbers of trained hospital corpsmen to remain who otherwise would have elected to leave the service.

It is realized that the present rate of pay in the Navy does not equal the pay of the trades in civil life, but when the many advantages offered to men making a career of the Navy are compared to the doubtful opportunities in civil life the Navy does not suffer by comparison. All Navy men are familiar with the benefits and privileges offered to the enlisted men who remain in the service, but it is believed that many of them fail to weigh the value of a steady income, opportunity to travel, free medical attendance, subsistence, chances for promotion, and plenty of leave against a salary in civil life, which, although it may be much larger than the Navy pay, will not leave, after the deductions for necessary living expenses, as much to bank against on a rainy day as can be put aside in the Navy. Furthermore, in civil life very few positions offer the privileges of retirement with pay after a comparatively few years' service as the Navy does.

The Hospital Corps can not at the present time offer the opportunities for a commission that exists in other branches of the service, but it is hoped that in the near future the Hospital Corps will be given an opportunity to strive for a commission such as now exists in the other branches.

No body of men in any service during the Great War performed more brilliant work than the Hospital Corps of the Navy, which due to its noncombatant character usually fails to receive the acclaim and praise awarded to the combatant arms of the services. Fully 75 per cent of the hospital corpsmen who served on the battle fields

of Europe with the marines were cited or decorated for bravery, and hospital corpsmen on board destroyers, cargo boats, transports, battleships, hospital ships, and in naval hospitals and stations in this country and abroad battled day and night, with no thought of the risks they ran and no hope or reward, to defeat disease, which was more disastrous to our men than the enemy bullets.

One hundred ninety-six alnav.—July 14, 1919. The following instructions, based on the provisions of the naval appropriation bill of July 11, 1919, will be brought to the attention of all concerned: Commanding officers are authorized to transfer to the Regular Navy to serve unexpired portion of his enrollment any man of the Naval Reserve Force, whether now on active or inactive duty, who is not more than 45 years of age, makes request for such transfer, has performed active duty during the war, and will have not less than one year to serve in the Regular Navy after such transfer. Enter transfer in current enrollment record, make notation of transfer in red ink on outside of record, paste copy of request in record, and report transfer to bureau on Form N Nav 8. Reserves so transferred shall receive the same pay, rights, privileges, and allowances in all respects as now provided by existing law for men regularly discharged and reenlisted within four months upon expiration of full four-year enlistment. This includes one month's leave, and extra pay for reenlistment, extra pay for citizenship, and four months' gratuity pay, if man's service has been such as to entitle him to honorable discharge under provisions of bureau's annual circular of January 1, 1918, and circular letter No. 40-19. It does not include \$60 bonus nor transportation allowance of 5 cents per mile to man's home.

Commanding officers are authorized to extend enlistments of men who enlisted for duration of war and request extension for one, two, three, or four full years, provided these men are otherwise entitled to honorable discharge in accordance with bureau's annual circular of January 1, 1918, and circular letter 40-19. Upon such extensions they shall receive rights, privileges, pay, and allowances as now provided by law for men who extend enlistment on completion of regular term of enlistment. This includes one month's leave, extra pay for reenlistment and for citizenship, gratuity pay at rate of one month's pay for each year's extension.

It does not include \$60 bonus nor transportation allowance, of 5 cents per mile to man's home. The same procedure shall obtain as prescribed for the extension of four years or minority enlistments, using Form N Nav 8323 substituting the words "duration of war," "four years" and striking out the first sentence from the word "ending" to the word "solemnly" and substituting

therefor the following "June thirtieth, nineteen hundred and twenty, approved eleven July, nineteen hundred and nineteen," and considering that date of expiration of duration enlistment for such men is date on which extension is made.

Men who enlisted or reenlisted for a period of four years since February 3, 1917, and before November 11, 1918, and so request, prior to September 1, 1919, shall be considered as having enlisted for duration of war, and are entitled to honorable discharge under conditions prescribed in bureau's annual circular of January 1, 1918, and circular letter 40-19. Such of these men as change their enlistments to duration of war and then desire to extend such enlistments for one, two, three, or four full years are entitled to benefits prescribed above for such extensions.

Bureau desires to call attention of all men affected to benefits offered by these provisions and hopes for great number of transfers and extensions to meet coming shortage of personnel.

Men who take advantage of these provisions to secure discharge and thereafter reenlist within four months for a period of four years are entitled to benefits of gratuity pay provided by existing law for reenlistments.

No refund will be required from continuous service men who change their enlistments to duration of war in accordance with these instructions.

In case of men changing from four-year enlistment to duration-of-war enlistment enter change in current enlistment record, make notation of change in red ink on outside of cover, paste copy of request in record, and report change to Bureau on Form N Nav eight.

Present war pay for enlisted personnel to continue in effect during current enlistment for all men now in the service or who enlist or reenlist prior to July 1, 1920.

Continue releases in accordance with current instructions except that hereafter all men who enlisted or reenlisted for four years or minority since February 3, 1917, and before November 11, 1918, shall be considered as duration-of-war men provided their records have been changed in accordance with instructions herein.

All enlisted men of regular Navy, whether enlisted for four years or for duration of war, who have performed active service at any time during period April 6, 1917, to November 11, 1918, both dates inclusive, and who may hereafter be discharged, shall receive an honorable discharge provided their records are such as to entitle them to honorable discharge in accordance with provisions of bureau's annual circular of January 1, 1918, and circular letter 40-19.

(Bureau of Navigation circular letter No. 87-19.)

NAVY DEPARTMENT,
BUREAU OF NAVIGATION,
Washington, D. C., June 19, 1919.

To: All ships and stations.

Subject: Bulletin of advisory committee of American Pharmaceutical Association.

1. A request has been received from the above association asking that publicity be given to the following bulletin:

SOLDIER AND SAILOR PHARMACISTS.

Druggists and drug clerks looking to their future are requested while in the service to communicate with the advisory committee of the American Pharmaceutical Association for soldier and sailor pharmacists, 1005 Mercantile Library Building, Cincinnati, Ohio.

POSITIONS, STORE OPENINGS, PARTNERSHIPS, RECIPROCAL REGISTRATION, COLLEGE OPPORTUNITIES.

Every soldier and sailor pharmacist is requested to send his name and address for the compilation of the honor roll.

2. Commanding officers are requested to bring the foregoing to the attention of men about to be discharged who may be interested in the announcement contained in this bulletin.

R. H. LEIGH,
Acting Chief of Bureau.

Bureau of Navigation circular letter No. 119-19.)

N630—LTD—RE2158-1262.
NAVY DEPARTMENT,
BUREAU OF NAVIGATION,
Washington, D. C., August 25, 1919.

To: All ships and stations.

Subject: Ratings of chief petty officers.

Reference: (a) Bureau of Navigation Annual Circular dated January 1, 1918.

1. At the present time the number of chief petty officers is far in excess of the number necessary to maintain the proper proportion of chief petty officers to other ratings. In order to reestablish a proper proportion between the various ratings it is necessary that all chief petty officers be rated by the bureau.

2. Strike out paragraph 1 of reference (a) and in lieu thereof substitute the following:

"No men will be rated chief petty officers except upon authority from the Bureau of Navigation. All men recommended for rating as chief petty officers will be examined in accordance with reference (a) and G. O. No. 63. Reports of examination of men recommended for chief petty officers will be forwarded to the bureau. The bureau will maintain a list of all chief petty officers recommended, and as vacancies occur men who have been recommended by commanding officers will be advanced to the rating recommended, if in all respects qualified."

3. While at the present time it will not be possible to advance many men to chief petty officer ratings, it is expected that the large recruiting drive which is now being conducted, and which will be continued during the next year, will obtain sufficient men for the service to allow the promotion of many men to chief petty officers within the year.

R. H. LEIGH.

(Bureau of Navigation Circular Letter No. 120-19.)

N630—LTD—RE2158-1263.

NAVY DEPARTMENT,
BUREAU OF NAVIGATION,
Washington, D. C., August 25, 1919.

To: All ships and stations.

Subject: Permanent appointment—Correction of Bureau of Navigation annual circular dated January 1, 1918.

Reference: (a) Bureau of Navigation annual circular dated January 1, 1918.

(b) Bureau of Navigation Circular Letter 199-18.

1. Make the following change in Bureau of Navigation annual circular dated January 1, 1918, paragraph 55, page 13. Strike out the last sentence of reference (a) as corrected by reference (b) and substitute in lieu thereof the following:

"In no case will a permanent appointment be given to a chief petty officer who has not served at least one year at sea in his rating, except that with the approval of the Bureau of Navigation, chief petty officers performing strictly aviation duties, in accordance with Bureau of Navigation Circular Letter 158-18, may be given permanent appointments after one year's service in their rating at an operating air station."

R. H. LEIGH.

One hundred ninety-seven alnav.—Naval appropriation bill approved July 11, 1919, provides in part, "Until 30 June, nineteen twenty, enlistments in the Navy may be for terms of two, three, or four years and all laws not applicable to four-year enlistments shall apply under such regulations as may be prescribed by the Secretary of the Navy to enlistments for a shorter period with proportionate benefits

upon discharge and reenlistments." Enlistments authorized for two, three or four years at option of recruit in all ratings now open for first enlistment except that applicants for machinists' mates school and for aviation mechanic schools will not be enlisted for shorter periods than three years. Minors under 18 may be enlisted for two or three years or period of minority, at their option, with consent of parent or guardian, as before. Exercise greatest care in preparation of shipping articles and all enlistment papers to show proper term of enlistment in each case. Men reenlisting for two, three, or four years are entitled to extra pay for reenlistment under continuous service, extra pay for citizenship, and to two, three, or four months' honorable discharge gratuity, respectively, if reenlisting after honorable discharge. Present war pay now permanent for men during current enlistment and for all men enlisting or reenlisting prior to July 1, 1920, of the term of such enlistment or reenlistment. Give fullest publicity and endeavor to increase enlistments maximum.

Two hundred fourteen alnav.—The attention of the service is invited to the fact that the department intends to discontinue the issuance of original temporary appointments to the line, to all Staff Corps, and to warrant and chief warrant ranks, in the near future. Accordingly reports of the examining boards in the cases of candidates for such appointments received in the department on or after September 1, 1919, will not be considered.

Commissions for Hospital Corps.—A bill has recently been introduced in the House by Congressman Darrow "to increase the efficiency of the medical department of the United States Navy and to improve the status and efficiency of the Hospital Corps of the United States Navy." The plan provides for the establishment of commissioned grades in the naval Hospital Corps of ensign, lieutenant (j. g.), lieutenant and lieutenant commander; and further authorizes the selection of lieutenant commander for advancement in pay and allowances (but not in rank) to commander and captain, subject to examination. All appointments are to be subject to examination as to the physical, mental, moral, and professional qualifications of the applicants. Those chief pharmacists and pharmacists who were issued temporary commissions as assistant surgeons under the act of May 22, 1917, are to be immediately eligible for appointment as ensign, lieutenant (j. g.), lieutenant or lieutenant commander in the ranks held by them temporarily. This bill has not met the approval of the Navy Department. It is realized, however, that some measure of relief is due those members of the Pharmacist Corps who were issued anomalous commissions as assistant surgeons in the medical department, a position for which they were not professionally qualified, but which offered the only means of temporarily promoting

worthy members of the Hospital Corps. At the outset of our participation in the war it became necessary to at once turn to the chief warrant, warrant and petty officer grades for temporary commissioned officers, a logical method of expansion for the line; and to avoid showing any discrimination against the pharmacists they were promoted in like manner to commissions in the Medical Corps. They were not surgeons or doctors, however, and the situation led to some embarrassment, both to the individuals and to the service, particularly where these newly-commissioned officers found themselves serving with troops where their unique status was not understood. The members of the Hospital Corps naturally desire the same opportunities for advancement as are or may be extended to other warrant grades; and it is presumed that the bill of Congressman Darrow has been prepared by the members of the corps with a view of affording them an avenue of advancement within their own corps, and without the necessity of accepting a commission for which they have not the professional attainments. This measure, with other proposals for new personnel legislation, will probably not be given much consideration by the House Naval Committee until fall, when it is believed that a number of recommendations growing out of the war will be taken up.—(FROM ARMY AND NAVY REGISTER, June 29, 1919.)

HOSPITAL CORPSMEN COMMENDED.

Their names and the deeds performed by the following corpsmen of the Second Division are published as being well worthy of emulation and praise:

HARRY K. WILEY, pharmacist's mate, third class, Company II, Fifth Marines, showed exceptional devotion to duty and great bravery when, regardless of personal safety, day and night for two days, without rest and under constant artillery and machine-gun fire, he carried in the wounded, saving many lives. This near Vierzy, July 19, 1918.

NATHAN GEORGE, pharmacist's mate, third class, Company D, Fifth Marines, in the Forêt de Villers-Cotterets, northwest of the town of Vierzy, on the morning of July 18, 1918, displayed unusual zeal and bravery in attending and carrying away the wounded under heavy shell fire and in a maze of wire entanglements. This near Vierzy, July 18, 1918.

BENJAMIN D. WEAVER, pharmacist's mate, third class, Company K, Fifth Marines, displayed extraordinary heroism under heavy shell fire in repeatedly exposing himself while giving first aid to the wounded. This near Vauxcastille, July 19, 1918.

LE ROY N. MCKENNY, pharmacist's mate, third class, Company M, Fifth Marines, rendered cool and excellent service under shell fire in a constantly exposed position, giving first aid to the wounded of his company. This near Vauxcastille, July 19, 1918.

JOSEPH H. JAMMIE, pharmacist's mate, third class, Company K, Fifth Marines, showed extraordinary heroism in repeatedly exposing himself under heavy shell fire to give first aid to the wounded. This near Vauxcastille, July 19, 1918.

EDMUND P. GROH, pharmacist's mate, third class, Sixth Marines, having shown great courage in dressing the wounded in an open field, continued in the performance of this duty after being wounded, refusing to be evacuated until he had completed the dressing of all wounded brought to him. This near Vierzy, July 19, 1918.

LEVEQUE L. WHALEN, hospital apprentice, first class, Sixth Marines, continued throughout the day, under terrific machine-gun and artillery fire, to dress the wounded and remove them to places of safety, several times performing this duty between opposing lines, when he was subjected to the fire of both sides. This near Vierzy, July 19, 1918.

URSHER L. FIFER, pharmacist's mate, Sixth Marines. He advanced with infantry through a heavy machine-gun fire, aiding the wounded when they fell. He carried wounded from the front line to Vierzy, under heavy fire, bringing back stretchers and water for the wounded. When prisoners were being brought in he fearlessly ran along a line exposed to snipers and machine-gun fire to direct the guards to wounded men in order that they might be promptly evacuated. This near Vierzy, July 19, 1918.

HORATIO D. GATES, chief pharmacist's mate, Sixth Marines; OLIVER W. PILKERTON, hospital apprentice, first class, Sixth Marines; LESTER K. LAYTON, hospital apprentice, Sixth Marines. Exposed to heavy fire in the open, and without adequate shelter, these three men performed valuable service in giving prompt and effective aid to the wounded, undoubtedly saving many lives. This near Vierzy, July 19, 1918.

In the action near Vierzy, July 19, 1918. CLYDE A. KINKLE, hospital apprentice, Sixth Marines, in an open field and under heavy fire, was conspicuous for his incessant work aiding the wounded, until he fainted from exhaustion at the end of 10 hours' duty. This near Vierzy, July 19, 1918.

BERNARD W. HERMAN, pharmacist's mate, second class, Sixth Marines, showed conspicuous courage and coolness in action, giving first aid to the wounded in the open and under heavy enemy fire. This at Vierzy, July 19, 1918.

OCLIA K. MANAHAN, chief pharmacist's mate, Sixth Machine Gun Battalion, left the shelter of the dressing station and treated wounded in an open field under heavy shell and machine-gun fire, and was himself wounded while so doing. This near Vierzy, July 19, 1918.

On July 19, 1918, HENRY T. GARRIS, pharmacist's mate, third class, Sixth Machine Gun Battalion, while serving in the front line near Tigny, after carrying a wounded man to the rear and returning under heavy artillery and machine-gun fire, discovered a wounded man in an open field in direct view of the enemy, calling for water. He returned to the line, got permission to go for water, a distance of about 2 kilometers, and administered to the wounded, being all this time in view and under heavy fire of the enemy. This near Vierzy, July 19, 1918.

CHARLES W. BATEMAN, pharmacist's mate, first class, Sixth Machine Gun Battalion, aided the wounded under heavy shell fire. He took charge of two German prisoners and assisted the wounded to the rear continually, returning for more, and being always under heavy fire. He showed great bravery by continually exposing himself. This near Vierzy, July 19, 1918.

FRANK H. GEHRKE, pharmacist's mate, third class, Sixth Machine Gun Battalion, was blown down a 20-foot embankment by a shell burst near by and badly shaken up during the heavy shelling of his position. Although suffering from partial shell shock, he refused to leave his post, and continued to dress the wounded. This near Vierzy, July 19, 1918.

ARCHIE B. KIRKLAND, pharmacist's mate, first class, Sixth Machine Gun Battalion, showed great bravery near Vierzy, July 19, 1918, continually remaining under very heavy shell fire, taking care of the wounded and assisting them to the rear. This near Vierzy, July 19, 1918.

In the action near Vierzy on July 19, 1918, JESSE C. BECKETT, chief pharmacist's mate, in the face of great danger went after water several times, which was desired for the use of approximately 2,000 casualties evacuated via the regimental aid station. This noble deed resulted in the relief of much suffering.

MORTON L. BENNETT, hospital apprentice, first class, in the action against the enemy near Thiaucourt, France, on September 15, 1918, left his regular station under intense shell fire, not caring for his own safety, to attend his severely wounded comrades, thereby saving many of their lives.

MERLIN T. BONE, hospital apprentice, first class, United States Navy, and JOHN H. MARKKS, pharmacist's mate, third class, United States Navy, attached to the 74th Company were wounded, while in fearless and efficient aid to the wounded, under fire of high-explosive and gas shells in the Bois de Belleau on June 13, 1918.

WILLIAM J. BRACKEN, pharmacist's mate, second class, at Blanc Mont, Champagne region, France, October 3-10, 1918 showed great devotion to duty in giving first aid and evacuating the wounded under very trying conditions.

RAYMOND R. BROWN, pharmacist's mate, third class, at Blanc Mont, Champagne region, France, October 3-7, 1918, was fearless in exposing himself continuously to enemy machine-gun and shell fire in order to give first aid and evacuate the wounded. Killed while performing one of these deeds.

THOMAS BROWNFIELD, pharmacist's mate, third class, attached to the 74th Company, was most commendable in giving first aid to the wounded in the Bois de Belleau on June 13, 1918, under heavy high-explosive and gas shell fire. He continued his work until severely gassed.

CLIFTON C. CAMPBELL, pharmacist's mate, third class, and WILLIAM W. NOONAN, pharmacist's mate, first class, United States Navy, carried out their work on June 12, 1918, administering aid to the wounded while under intense artillery barrages. They continued their work after they had been blown out of a trench by shell fire and did not cease until all men in need had been cared for. (Mentioned in Division General Order 44; awarded the croix de guerre by the commanding general of the French Armies of the north and northeast.)

MACLYN E. DENT, chief pharmacist's mate. In the Bois de Belleau between June 10-15, 1918, he tirelessly cared for all wounded in an open culvert exposed to constant heavy artillery fire.

WILLIAM B. EVANS, pharmacist's mate, third class, attached to Company M in the capture of the town of Bouresche, June 6, 1918, showed rare devotion to duty and courage in caring for the wounded while under fire.

JAMES H. GRANTHAM, pharmacist's mate, third class, attached to the 95th Company in the Meuse-Argonne, France, on November 1, 1918, with unwavering courage and utter disregard for all personal danger, dressed and attended wounded in the face of constant and terrific machine-gun and shell fire until himself killed while in the act of dressing a wounded comrade.

RAYMOND KAGA, pharmacist's mate, second class, attached to the 95th Company in the action against the enemy near Thiaucourt, France, on September 15, 1918, disregarded all personal danger and was indefatigable in rendering assistance to the wounded under heavy constant shell fire. His calm courage and energetic attention to duty was an inspiration to the entire command.

CARL O. KINGSBURY, hospital apprentice, first class, and FRED C. SCHAFFNER, pharmacist's mate, third class, displayed highly commendable action in the immediate care and evacuation of more

than 100 casualties following gas shell bombardment on the morning of April 13, 1918, after they themselves had been subjected to the poisonous gas. These men worked unceasingly for the comfort and welfare of the sick, disregarding their own premonitory symptoms, insisting that they were all right and not affected, showing the true spirit of sacrifice characteristic of the men who have volunteered their services in such an unselfish and honorable organization. When visible symptoms were noticed they were relieved and evacuated much against their wills, for they knew that their work had not been completed. (Awarded the distinguished-service cross by the Commanding General of the American Expeditionary Forces.)

SPENCER J. LEWIS, pharmacist's mate, second class, at Blanc Mont, Champagne region, France, October 3-10, 1918, showed great devotion to duty in giving first aid and evacuating wounded under trying conditions throughout the engagement.

JOHN R. LITCHFIELD, pharmacist's mate, third class, and MARTIN W. SPENCE, pharmacist's mate, second class, after the capture of formidable machine-gun nests by the 76th Company in the Bois de Belleau on June 8, 1918, rendered conspicuous service following that victory. The company to which they were attached was subjected to heavy bombardment half hourly for 48 hours and sustained heavy casualties. Under this heavy fire both day and night they worked unceasingly and, due to their efforts, casualties were held to lower figures than otherwise would have been possible.

NATHANIEL LUFKIN, pharmacist's mate, third class, at Blanc Mont, Champagne region, France, on October 3-10, 1918, fearlessly exposed himself in giving first aid to and evacuating the wounded.

JAMES E. MANNING, hospital apprentice, first class, attached to the first battalion in the action against the enemy near Thiaucourt, France. On September 15, 1918, while attending to a wounded man the dressing station was hit with a shell and the patient was wounded in two more places. Hospital Apprentice Manning showed great devotion dressing the new wounds, and while doing so was struck in the back and knocked down by the explosion of another shell striking the aid station. He refused to leave his post until he had finished dressing the wounded man and had removed him from the dressing station, which was completely gutted by another shell a minute later. During the entire action Hospital Apprentice Manning was conspicuous for his courage and promptness in the care of the wounded.

HAL E. MARTIN, hospital apprentice, first class, at Blanc Mont, Champagne region, France, October 3-10, 1918, went through a barrage and rescued a wounded man who had been dropped there when the stretcher bearers had been wounded.

ROGER Q. MORTON, pharmacist's mate, third class, at the Bois de Belleau, France, June 14, 1918, after a five-hour gas and high-explosive bombardment of the aid station in which he was working, although badly gassed and subsequently evacuated, refused to leave and continued to care for the wounded until all other hospital corpsmen had been removed to another place of safety.

JUNIUS E. REISTER, pharmacist's mate, third class, in the engagement near Bouresche and the Bois de Belleau, France, on June 6-7, 1918, when the company to which this hospital corpsman was attached was caught in a terrible enemy barrage which resulted in the evacuation of more than two-thirds of the company as casualties, stuck to his post fearlessly when death was certain, administering to his unfortunate comrades until all casualties were evacuated and then volunteered his services to another company entering the line.

THOMAS R. SMITH, pharmacist's mate, first class, at Blanc Mont, Champagne region, France, October 3-10, 1918, showed great devotion to duty in giving first aid and evacuating the wounded under very trying conditions throughout the engagement.

ENNIS, C. STATON, hospital apprentice, first class, at Blanc Mont, Champagne region, France, October 3-10, 1918, exposed himself to heavy shell fire to dress and evacuate the wounded of another regiment and of the enemy.

PARKE C. STRATFORD, pharmacist's mate, second class, in the action at Bouresche and the Bois de Belleau, France, between June 2-19, 1918, labored incessantly day and night administering to the unfortunates of 19 different organizations that were evacuated via the regimental aid station. When the building was struck by a large-caliber shell which caused the building to collapse on 10 patients resting within, his heroic character was most conspicuous. Without thought of personal danger and the collapsing building he went into the tumbling mass and rescued several of the men buried in the falling timbers.

LESLIE R. TAYLOR, pharmacist's mate, second class, in the Meuse-Argonne, France, during the attack on the morning of November 1, 1918, showed extraordinary coolness, courage, and devotion to duty while under heavy shell fire. After the occupation of the town of Bayonville he organized and maintained a point of evacuation and first aid for over 16 hours with only German prisoners as subordinates. Also, while under heavy shell fire, he organized details of German prisoners to act as litter bearers, making it possible to evacuate several hundred wounded men without the aid of ambulances, continuing this work without food or rest until the arrival of a unit of the medical department.

WILLIAM W. WAYNE, pharmacist's mate, third class, attached to the 96th Company in the action against the enemy near Thiaucourt, France, on September 15, 1918, did gallant work in caring for many wounded and giving first aid under heavy shell fire. He was constantly subjected to direct fire from machine guns and worked under heavy barrage, but his courage never wavered and he continued his work without ceasing.

CHARLES H. WHITACRE, chief pharmacist's mate, was conspicuous for services rendered in establishing a litter evacuation system from the front line in the Bois de Belleau to the battalion aid station. This duty was performed under very harassing conditions and resulted in the saving of many lives.

FRED E. WYSE, pharmacist's mate, third class, at Blanc Mont, Champagne region, France, October 3-10, 1918, went through a barrage and rescued four wounded men, bringing them back to safety.

U. S. NAVAL HOSPITAL,
LEAGUE ISLAND, PA., *June 3, 1919.*

From: Commanding officer.

To: Bureau of Navigation.

Via: Commandant, Fourth Naval District.

Subject: Noteworthy action performed by William J. McCabe, hospital apprentice, second class, Reserve Force.

1. On Saturday, May 31, there was admitted to this hospital R. S. Delaney, chief machinist's mate, United States Navy, who had been injured in an automobile accident. Examination showed that he probably had a severe internal hemorrhage. An operation was immediately performed and it was found that his intestines had been torn loose from the mesenteric attachment. As a result he had a tremendous internal hemorrhage. The hemorrhage was controlled and the bowel reset. Delaney did not respond to transfusion of salt solution and it was decided that in order to save his life it would be necessary to resort to direct transfusion of blood.

2. His condition was so bad that we did not feel that even this procedure would give much hope. We asked for volunteers to donate blood and William J. McCabe, hospital apprentice, second class, U. S. N. R. F., volunteered to be the donor. The danger and possible subsequent disability was explained to McCabe but he did not hesitate a moment, but offered himself that Delaney might have a chance to be saved.

3. I feel that due record should be made of McCabe's unselfish and generous action in this matter, and that he should be commended for it.

R. C. HOLCOMB.

EXTRACTS FROM ANNUAL SANITARY REPORT FROM SIXTH REGIMENT, U. S. M. C.,
AMERICAN EXPEDITIONARY FORCES.

The regimental medical department has been fortunate at all times in having an abundance of well trained, willing and courageous hospital corpsmen and to them belongs the greatest share of the credit in giving first aid to the wounded in the most advanced positions. Sixty-nine citations for bravery in action have been given members of the Hospital Corps of this regiment, and over half of them have been made by line officers. There have been a number of distinguished service crosses and croix de guerre awarded. Many have been mentioned in divisional orders and many citations have not as yet been heard from.

Their courage and spirit of self-sacrifice has always been in accordance with the best traditions of the Navy.

U. S. NAVAL HOSPITAL,
BROOKLYN, N. Y., *April 17, 1919.*

From: Commanding officer.

To: Bureau of Medicine and Surgery.

Subject: Commendatory letter re hospital corpsmen.

Inclosure: (a) Copy of letter from the superintendent of St. Mary's Hospital.

1. Inclosed is a copy of commendatory letter relative to the activities of the hospital corpsmen detailed to look after naval patients at St. Mary's Hospital, Brooklyn, N. Y.

G. A. LUNG.

ST. MARY'S HOSPITAL, BROOKLYN, N. Y.
Captain G. A. LUNG, M. C., U. S. N.,
Commanding Officer, U. S. Naval Hospital, Brooklyn, N. Y.

DEAR DOCTOR LUNG. I really feel so grateful to you for sending us those splendid hospital corpsmen that I must tell you that you could not rate their kindness, skill, and usefulness too highly. I was glad that they were sorry to leave St. Mary's, because all had grown to like the boys for their bright cheery ways and the hearty manner in which they did a trying or disagreeable duty. In their months of service they never deserved a serious reprimand. We are mutually proud of that record.

I know that it was through your consideration that the boys were assigned here, and I thank you for all the kindness that you have shown St. Mary's.

Very sincerely, yours,

SISTER MARY MARGARET,
Superintendent.

Holy Week, 1919.

PROMOTIONS.

The following pharmacists temporary, United States Navy and United States Naval Reserve Force, have been appointed temporary chief pharmacists, United States Navy or United States Naval Reserve Force, as shown below:

CHIEF PHARMACISTS (T.).

Alexander, C. C.
 Anderson, R. D.
 Aron, E. E.
 Austin, H. S.
 Bartle, W. E. G.
 Beasley, C.
 Bly, W. F.
 Bote, L. E.
 Burr, W. S.
 Cassady, J. T. (F. N. R.)
 Chatfield, H. B.
 Cogswell, F. L.
 Cooney, J. P.
 Crell, W. F.
 Dean, C. H.
 Diamond, J. K.
 Dunphy, R. M.
 Durkin, J. F.
 Eldridge, A. L.
 Gilliam, W. G. (F. N. R.)
 Greenough, H. L.
 Hart, T. C.
 Hervey, D. M.
 Heuschling, A. J.
 Hildreth, T. L.
 Hogue, H.
 Holmes, C. R.
 Holmes, J. K.
 Hummell, J. O. E.
 Huston, W. H.
 Irwin, B. E.
 Jackson, W. A.
 Jones, B. C.
 Kimball, C. O.
 King, R. W.
 Kirkpatrick, J. A.
 Knowles, H. P.
 Leh, A. R.
 Lergenmiller, J. J.

Levansaler, J.
 Libbon, J. A.
 Lyon, G. F.
 McCallum, L. M.
 McKee, W. W.
 Magoon, W. C.
 Martin, R.
 Meagher, T. E.
 Mears, F. D.
 Meyer, J. H.
 Montgomery, A. B.
 O'Reilly, F. E.
 Owen, C. J.
 Pennington, E. H.
 Randolph, H. E.
 Redman, F. B.
 Reed, J. H.
 Rider, L. W.
 Riney, W. J.
 Rogers, H. L.
 Rowe, L.
 Rozea, E. A.
 Ryan, H. L.
 Rydeen, H.
 Saunders, N. L.
 Sheridan, W. F.
 Smith, K. M.
 Steen, C. R.
 Stewart, W. L.
 Tolderlund, H.
 Watson, R.
 Weaver, E. E.
 Wetherell, F. G.
 Wiggins, T. B.
 Wildasin, G. O.
 Williamson, H. H. (U. S. N. R. F.)
 Zimmerman, M. E.
 Zur Linden, W.

Since the last issue of the SUPPLEMENT the Bureau of Medicine and Surgery has been informed ^{PE} that the following-named men have been recommended for the rate:

CHIEF PHARMACIST'S MATES.

Anderson, C. S.	Furr, W. P.
Arnold, G. E.	Gardner, E. T.
Ashman, J. H.	Gardner, H. M.
Augustine, G. V.	Gibson, Ed.
Barkley, C. L.	Gladney, J. C.
Baxter, L. E.	Graham, F. A.
Beecroft, A. L.	Harkins, E. W.
Benison, C. F.	Hastings, L. W.
Benline, C. J.	Hickok, H. G.
Bland, J. R.	Higgins, N. L.
Bloom, F. E.	Hinkley, A. B.
Bockemuehl, A. M.	Hodgkinson, L. J.
Boerner, E. G.	Huff, M.
Bostick, E. L.	Isaacson, A. V.
Boswell, W. I.	Jacoby, M.
Bower, J. M.	Jamieson, R. H.
Brinkman, A. J.	Jarvis, C. H.
Burres, C. S.	Joerger, J. W.
Butterley, W. S.	Joyce, W. K.
Cahill, M. L.	Kelly, J. D.
Campbell, G. R.	Keye, J. D.
Carroll, D. M.	King, T. R.
Carlson, J. E.	Kirby, R. H.
Clymer, L. B.	Kistler, W. D.
Coburn, W. S.	Knight, T. W.
Cope, M. B.	Lancaster, J. P.
Cook, L. A.	Landrum, J. P.
Coon, H. M.	LaValley, L. E.
Covin, R.	Leser, R. J.
Curtis, G. C.	Lester, C. J.
Cutting, C. P.	Little, A. A.
Dale, W. E.	McAlpin, W. T.
Dauids, J. N.	Mangold, M. H.
DeGeneres, E. M.	Matthews, J. J.
DePuy, R.	Meade, J. B.
Dixon, L. M.	Miller, J. D.
Doty, L. L.	Miller N. C.
Doty, F.	Milliron, E. O.
Drown, M. D.	Mitchell, C. M.
Emmons, H. M.	Mundorf, L. P. H.
Ferguson, J. N.	Nixon, O. E.
Field, J. H.	Owens, A. W.
Fouts, C. B.	Park, M. C.
Frank, H. J.	Pearson, W. N.
Frazier, G. G.	Pence, L. S.
Fridge, C. F.	Peterson, C. L.
Friedman, H.	Pico, F. C.

Piersol, H. W.
 Pyle, H. F.
 Rodemich, L. F.
 Risk, P. H.
 Schneider, W. C.
 Shaffer, S. C.
 Shepard, H. N.
 Sheperd, R. C.
 Shields, W. S.
 Sibley, L. C.
 Simons, A. T.
 Stansbury, H. M.
 Stiefel, C.
 Stillwell, J. R.
 Surface, A. L.
 Swanson, W. B.

Townsend, R. E.
 Travis, L. R.
 Troop, G. S.
 Tyner, G. S.
 Whiting, A. W.
 Whitlow, W. D.
 Wiley, H. G.
 Williams, Ed.
 Williams, W.
 Williamson, C. E.
 Wilson, G. H.
 Wilson, R. J.
 Wright, J. A.
 Wright, P. L.
 Zoll, G. C.

PHARMACIST'S MATE, FIRST CLASS.

Adamson, L. R.
 Akin, C.
 Alexander, J. B.
 Anderson, G. M.
 Arnold, W. W.
 Atcheson, T. J.
 Atkinson, E. G.
 Auld, M. H.
 Avera, S. C.
 Avery, W. E.
 Badgett, H. A.
 Balcom, J. E.
 Balldridge, J. G.
 Barclay, W. B.
 Barnes, C. A.
 Barrett, H. H.
 Bass, J. E.
 Batchelor, G.
 Bazinet, H. A.
 Beard, R. M.
 Bedford, W.
 Beeckel, N. A.
 Belser, B. T.
 Bem, C.
 Benson, J. D.
 Blake, J. M.
 Blackburn, W. E.
 Blanchard, W. N.
 Blume, H. A.
 Bohn, H. M.
 Bonham, C. B.
 Brabec, T. J.
 Brock, F. D.
 Brown, M. A.
 Bryant, R. F.

Buckley, B. O.
 Buell, F. E.
 Bugg, D. R.
 Bullock, E. M.
 Burget, R. F.
 Burnell, P. J.
 Cain, W. C.
 Call, L. G.
 Callison, C. P.
 Canfield, S. P.
 Carey, L. D.
 Carlson, W. E.
 Carter, W. R.
 Cassidy, F. J.
 Chambers, B. P.
 Chase, E. S.
 Christian, E. J.
 Christopherson, A. M.
 Clark, A. M.
 Clark, S. A.
 Clements, J. C.
 Cohen, C. J.
 Collins, R. O.
 Colvard, G. T.
 Corden, J. P.
 Creevan, M. J.
 Crittenden, F. L.
 Crofton, R. E.
 Croft, J. A.
 Crowson, E. J.
 Cruse, A. W.
 Curran, F. P.
 Custer, G. C.
 Eckerson, W. B.
 Edwards, C.

- Eifer, W. L.
 Eitel, W. A.
 Elmore, P. R.
 Engwall, M. S.
 Espy, R. E.
 Evans, W. E.
 Fagin, V. B.
 Farrell, I. A.
 Felt, C. H.
 Feuguay, A. P.
 Fisher, E. A., jr.
 Pitts, N. P.
 Fjelden, J. H.
 Flagg, W. C.
 Flann, D. H.
 Flynn, J. J.
 Fockler, H. L.
 Folson, H. M.
 Forte, J. O.
 Foss, H. M.
 Fouts, C. B.
 Franklin, F. M.
 Gardner, H. M.
 Gebbie, S. S.
 Ghere, H. W.
 Gilhousen, W. P.
 Goar, J. E.
 Gofonovitz, J.
 Gottman, V. C.
 Grant, H. M.
 Gray, J. S.
 Greenman, M.
 Griffith, B. S.
 Grimes, C. T.
 Grinman, A. R.
 Gunkel, E. O.
 Hager, W. M.
 Hall, W. H.
 Handley, L. O.
 Hardiman, J. J.
 Harris, A. W.
 Hart, R. C.
 Hartung, K. C.
 Hatton, P. A.
 Haught, H. E.
 Hayes, J.
 Heath, H. T.
 Hess, F. P.
 Hicks, H. G.
 Hill, R. M.
 Hodgson, W. C.
 Hoge, M. S.
 Holder, T. F.
 Holland, H. E.
 Howell, C. R.
 Hunt, L. M.
 Hunter, R. C.
 Hutcheson, W. L.
 Janssen, W. D.
 Jennings, W. K., jr.
 Johansen, J. J.
 Johnson, C. A.
 Johnson, J. M.
 Johnson, R. D.
 Jones, J. E.
 Jones, J. H.
 Kaga, R. L.
 Kammeyer, C. E.
 Kaupp, R. T.
 Kessner, N. T.
 Kinkade, F. L.
 Kirkgard, K. W.
 Klinner, W. H.
 Knapp, V. M.
 Koester, E. W.
 Koester, G. A.
 Lackey, W. C.
 Lahar, B. H.
 Lake, W. E.
 La Marche, A. E.
 Lawrence, H. C.
 Lawson, J. H.
 Leach, S. R.
 Leary, F. D.
 Leffingwell, T.
 Lillehei, E. J.
 Loomis, H. B.
 Love, H. H.
 McCaffery, J. H.
 McCarthy, A. A.
 McClellan, A.
 McComas, M.
 McElroy, R. J.
 McLaughlin, J. R.
 McNair, M. P.
 McPartland, J. R.
 Madden, E. T.
 Magill, E. E.
 Maltzberger, J. R.
 Manda, C. E.
 Manger, M. M.
 Manley, P. H.
 Marker, R. E.
 Martin, M. C.
 Mason, H. A.
 Matkin, T. W.

Mattison, J. B.
 Mechin, K.
 Merrill, E. L.
 Miertz, H. C.
 Miles, J. E.
 Miller, C. C.
 Mills, O. Y.
 Morgan, A. A.
 Morris, D.
 Morrison, M. C.
 Muller, E. K.
 Murdock, G. W.
 Murphy, J. B.
 Neale, G.
 Nelson, H. I.
 Nelson, J. J.
 Nolen, J. H.
 Obester, J. J.
 Olewiller, C. E.
 Osborn, R.
 Osuch, F. J.
 Parsons, W. R.
 Paulson, F. J.
 Peska, J. J.
 Peterson, A. A. J.
 Pickert, H.
 Pierson, H. B.
 Pin, J. A.
 Post, W. A.
 Presson, H. B.
 Price, J. R.
 Price, T.
 Proshok, H. F.
 Quass, H. P.
 Ragsdale, F. H.
 Raymond, S. W.
 Reagan, C.
 Redner, F. E.
 Reed, M. E.
 Reilly, J. P. C.
 Reister, J. E.
 Reynolds, F. A.
 Rhudy, B. C.
 Rickers, H.
 Richter, L. A.
 Riecks, H. K.
 Robertson, R. S.
 Robinson, Fred.
 Rohr, H. M.
 Rooker, J. R.
 Rough, R. L.
 Rozelle, M.
 Rubel, B. J.

Sanders, F. E.
 Sanderson, O. B.
 Schiek, H. B.
 Scott, H. A.
 Scott, W. B.
 Scott, W. L.
 Sebastian, G. E.
 Shorrock, H. L.
 Simpson, P.
 Smith, A. E.
 Smith, J. D.
 Smith, M. O.
 Smith, N. B.
 Smotherman, C. S.
 Soranuf, L. P.
 Speed, S. J.
 Spencer, W. F.
 Stanley, P. T.
 Stephens, C. R.
 Stephenson, R. H.
 Stobaugh, W. H.
 Stone, L. L.
 Street, J. S.
 Suprunowski, H. J.
 Swisher, A.
 Tarr, L. R.
 Tarrats, C.
 Taylor, A. E.
 Thomas, H. U.
 Thompson, R. E.
 Thorning, D. H.
 Thumser, L. F.
 Van Buskirk, H.
 Van Hookier, W. S.
 Van Oosterhout, R.
 Vaughan, W. E.
 Vinson, U. C.
 Walker, A. T.
 Walker, S. G.
 Walker, W. H.
 Walkoski, A. S.
 Waller, O. H.
 Ward, H. H.
 Warren, O. I.
 Watson, J. R.
 Weinkauff, H. J.
 Wharton, M. F.
 Wheeler, J. H.
 Whitehurst, A. D.
 Whiteman, I. B.
 Wilbur, S. C.
 Williams, A. B.
 Willis, J. E.

Willis, J. McP.
 Wilroy, C. A.
 Wilson, A. E.
 Wiygul, F. M.

Woeff, J. A.
 Wrightson, W. D.
 Yingling, W. L.

The following-named pharmacists, United States Naval Reserve Force, have been placed on inactive status at their own request.

Campbell, R. I.
 Moore, D. C.
 Hamilton, W. E.

Eckerson, T. H.
 Pike, C. A.

Appointments of the following-named pharmacists (T) have been revoked at their own request:

Welch, T.
 Thompson, C. A.

Fritch, J. E.
 Duchesney, C.

(CONCLUDING PAPERS OF ORIGINAL CORRESPONDENCE COURSE,
 SEE PP. 123, 124.)

PAPER No. 13.

PROBLEM.

The problems appearing in this paper are based on a large naval medical supply depot which constitutes a source of medical supplies for the entire navy.

(a) Estimate the number of 1-ounce tins of quinine sulphate necessary to supply a naval personnel of 300,000 for six months, and show what you base your estimate on.

(b) Devise some clerical scheme whereby you would be warned of impending shortages in stock in ample time to prevent embarrassing depletion of supplies, bearing in mind that medical and surgical supplies are not readily obtainable on short notice.

(c) Trace a Form "B" requisition from the time it is received at the supply depot to the time supplies are turned over to an express company, or other carrier for shipment, showing especially all clerical work involved.

(d) State how you would arrange for transportation of supplies to ships and stations (1) by Government carrier, (2) by express, and (3) as freight, showing clerical work involved and noting how you would comply with Interstate Commerce Commission regulations relating to explosives, acids and combustibles.

PAPER NO. 14.¹

(Third paper on supply depot work.)

The following problems are based on the testing department of a naval medical supply depot which constitutes the source of medical supplies for the entire Navy:

(a) Discuss the general tests applicable to textile fabrics issued by the depot, and show the significance of each test.

(b) Show what requirements you would incorporate in specifications on hypodermic tablets in general, in order to obtain tablets suitable for hypodermic medication.

(c) Describe tests you would apply to catgut ligatures.

(d) Show classes of supplies ("medicines," "dressings," etc.) in connection with which you consider it advisable to have bidders submit samples with their bids, and the classes of supplies in connection with which you consider it not advisable to require samples, giving your reasons in each case.

(e) Show what essential requirements you would incorporate in your specifications in order to obtain an up-to-date operating table.

ANSWER TO QUESTION No. 13.

ANSWER TO (A).

By reference to page 21, Supply Table for the Medical Department, 1918, it is noted that the allowance of quinine sulphate for 750 men is forty 25-gram bottles. Assuming that the allowance shown in the Supply Table is a six months' allowance, we would arrive at the six months' allowance for a personnel of 300,000 by simple proportion, viz:

$$\begin{array}{rcl} 750 & : & 300,000 = 40 : X. \\ \text{men.} & & \text{men.} \quad \text{bottles.} \end{array}$$

$X=16,000$ bottles theoretically required to supply a personnel of 300,000 for six months.

By consulting the supply depot's books, the average amount of quinine sulphate actually issued in six months for a personnel of known number would be obtained. The ratio between the average amount thus found and the amount theoretically required for a like

¹ Approximately 175 of the original participants in this course have failed to send in their answers to questions 11, 12, and 13. It is believed that this has been due to the pressure of duties incident to their routine work, and also, in a measure, to the delay that has been occasioned, in the office of the director of the course, in forwarding the answers to the questions enumerated. This delay has been due to the detachment of the former director and the assumption of his and of other duties by the present director. It is hoped that all those who have interrupted the course will now be able to resume it. The director would be pleased to receive suggestions from any member of the class relative to matters of general value to the service that might be used as the basis for future questions.

period and personnel, in accordance with calculations based on the Supply Table allowance, would then be determined and we would revise our theoretical requirements (16,000 bottles) in accordance with this ratio.

For convenience a table could be prepared showing for each item listed on the Supply Table the ratio between the amount actually issued and the theoretical requirement as calculated from the Supply Table allowance.

ANSWER TO (B).

The following answer is based on the assumption that the supply depot has ample storage facilities to accommodate a six months' "issue stock," with which to fill the usual requisitions, in addition to a reserve stock for meeting such contingencies as establishment of additional advance bases of supplies, destruction of existing bases of supplies, unexpected increase of the Navy, and inability to obtain supplies on account of unusual market conditions. The answer submitted deals with the "issue stock."

From statistics compiled from the account books and files of the supply depot it would be possible to determine, in the case of each item carried in stock, the rate of issue, i. e., the average amount issued on requisitions for a personnel of known number during a given period, and the rate, in point of time and quantity, at which each item could be replenished.

From the above data we could calculate the approximate amount of each item necessary to fill requisitions during the interim between the placing of a request for purchase (or an order) and delivery of the new supply by the contractor. To this approximate amount add 25 per cent of the amount required for issue during six months. The sum thus obtained could be considered a safe replenishing point for each item and would be the level to which the stock of the depot would be allowed to fall before a new supply would be required for.

It is obvious that by ordering 75 per cent of the total amount required for issue during six months as the stock fell to the replenishing point described above, we would, on the arrival of the new supply, have a full six months' supply on hand; provided, of course, that the rate of issue had not been unduly accelerated in the interim between the placing of the request, or order, and the delivery of the new supply.

The replenishing point and monthly rate of issue, together with the personnel on which the latter is based, would be entered in prominent red figures under each item heading in the stock book (or on the stock cards) kept by the stock clerk. As the stock clerk makes additions to and deductions from the amount carried on his books as supplies are received or issued, the stock book always shows a balance representing the amount of stock on hand. By referring to the

replenishing point at the head of the page each time he struck a new balance, the stock clerk would always be warned of impending shortages. As the stock approached the replenishing point the stock clerk would submit a memorandum to that effect to the senior pharmacist and on the memorandum he would note whether or not the rate of issue had been materially accelerated since the last replenishment. A marked change in the average monthly rate of issue would, of course, necessitate a readjustment of the replenishing point. On reporting an impending shortage the stock clerk would note in his book the date of such report.

ANSWER TO (C).

Receipt of the Form B requisition is acknowledged by letter to the maker, and note thereof is made on the supply depot's receipt cards.

All four copies of the requisition are then turned over to the pharmacist in charge of the stock. This officer, having made a list of such items as are required for in quantity approximating case lots, causes the cases ("original packages") to be taken out of store and marked. Meanwhile the items called for in lesser quantity are assembled simultaneously by four employees, each of whom has a copy of the Form B requisition penciled to show the particular part of the requisition he is to procure from the "open stock," i. e., the stock on the shelves.

When all the required items, with the exception of narcotics and liquor, have been assembled on the checking or packing tables, the depot's storekeeper checks the requisition. The requisition (the supplies) is then turned over to the packers and the particular part of the requisition assigned to each packer is finally checked by the pharmacist. When the packers are ready for the narcotics and liquor the pharmacist procures these items from the narcotic safe and they are checked and packed under his direct supervision. As the requisition is being packed the packing list is prepared on the third copy of the requisition, and on the fourth is noted by whom each box or package was packed.

The requisition having been packed, the packages (cases, crates, barrels, etc.) are addressed and packages containing dangerous chemicals are labeled as required by the Interstate Commerce Commission.

The packages are then sent to the shipping floor where the weight, cubic dimensions, and other data necessary in the preparation of bills of lading are determined. The bills of lading having been prepared, shipment is made. The bill of lading number, the date of shipment, number of packages comprising the requisition and the routing of the shipment are noted on the face of the packing list

(third copy of the requisition) and this list is mailed to the maker of the requisition when the supplies are shipped from the depot.

The first, second, and fourth copies of the requisitions are turned over to the bookkeeper who inserts the prices and expends from his books the supplies issued on the requisitions. The fourth copy is retained for the depot's files. The first and second copies are forwarded to the maker of the requisition.

(NOTE BY DIRECTOR OF THE CORRESPONDENCE COURSE.—In reviewing the papers of candidates for promotion in the Hospital Corps, it is found that the following question is frequently asked by the examining board: "How many copies of Form B are made out, and what is the ultimate destination of each copy?" The majority of answers to that question state that the fourth copy of the requisition Form B is *destroyed*, either in the supply depot or in the Bureau of Medicine and Surgery.)

When the first and second copies have been returned to the maker of the requisition he receipts them and sends the first to the supply depot, the second to the Bureau of Medicine and Surgery. It is therefore seen from the above that the ultimate destination of each copy of Form B is as follows:

First. Supply depot.

Second. Bureau of Medicine and Surgery.

Third. Returned to the maker (packing list).

Fourth. Retained by the supply depot.

ANSWER TO (D).

In preparing bills of lading for chemicals it is necessary to state on such bills of lading the number of "labeled" and "unlabeled" packages comprising the shipment. "Labeled" packages are those which contain chemicals which must be handled with special care and precaution to prevent accidents in transit, and such packages are required by Interstate Commerce Commission regulations to bear labels setting forth the precautions to be observed in handling the chemicals and the course to be pursued in event of breakage. Non-dangerous chemicals are not required to carry precautionary labels, and hence are termed "unlabeled goods." Packages containing inflammable chemicals must bear red labels, those containing explosives and powerful oxidizing agents require yellow labels, and acids carry white labels. Interstate Commerce Commission regulations require that containers holding acids, inflammables, and explosives generally, be packed in excelsior, sand, sawdust, or other acceptable material which will prevent the contained chemicals from scattering or seeping through in case of breakage. Nitric-acid containers must be packed in non-inflammable cushioning material. Under Interstate Com-

merce Commission regulations each particular variety of explosive, acid, or inflammable handled by the depot must be packed in a case or package by itself. This is, of course, a very important precaution against accidents. It is readily conceivable that if, for instance, an explosive were packed in a box with some powerful oxidizing agent and breakage ensued in transit, a very serious accident might result.

Limited amounts of dangerous (inflammable or explosive) chemicals may be shipped without labels. A list of the "labeled" chemicals handled by the supply depot, with exemptions and labeling governing same, follows:

List of principal dangerous articles shipped by medical supply depot.

	Labeled.	Quantity which may be shipped without label.
Alcohol.....	Red.....	1 gallon.
Collodion.....	do.....	Do.
Ether.....	do.....	5 pounds.
Picric acid, 20 per cent water added.....	Yellow.....	No exemption.
Potassium chlorate.....	do.....	25 pounds.
Potassium permanganate.....	do.....	Do.
Acid, nitric.....	White.....	No exemption.
Acid, hydrochloric.....	do.....	5 pints.
Acid, sulphuric.....	do.....	Do.

ANSWER TO (D-1).

Transportation of supplies by Government carriers is effected through the local supply officer. The supply depot furnishes the supply officer (shipping section) with an invoice showing the number of "labeled" and "unlabeled" packages (bales, crates, cases, etc.) to be shipped, their general contents and total cubic dimensions. When the shipping section is ready for the shipment the supply officer notifies the supply depot where and when to deliver the shipment for transportation, and informs the depot of the routing address and bill of lading number to be marked on the packages and on the bill of lading prepared by the supply depot. A memorandum copy of the bill of lading is forwarded to the medical officer to whom the shipment is consigned. The other copies, with the exception of the depot's file copy, go to the supply officer.

ANSWER TO (D-2)

In arranging for shipment by express the express company is notified and calls at the supply depot for the shipment. The depot prepares bill of lading setting forth the number of "unlabeled" packages and "labeled" packages, their total gross weight and gen-

eral contents. The rate charged by the express companies is based on weight alone and the preparation of a bill of lading for an express shipment is relatively simple.

Shipments from the supply depot are made by express when expedition is paramount to economy, and in the case of such "labeled" goods as are not accepted as freight.

ANSWER TO (D-3).

When supplies are sent as freight the depot delivers the shipment at the freight station. The depot's bill of lading has to show weight, cubic dimensions, contents of all packages, number of "labeled" packages and the freight classifications under which the various packages come in order that the proper rates may be obtained. For instance, a "knock-down" operating table would go under one rate, while an assembled operating table comes under another rate. Again, soft soap is accepted at one rate while hard soap is governed by another. The freight rate book is consulted and bill of lading prepared accordingly.

When freight is to go by a ship (other than a Government carrier) shipment is, as a general rule, conveniently effected through the supply officer who has lighterage facilities at his disposal, and generally has other shipments going the same route as the supply depot freight.

ANSWER TO QUESTION No. 14.

(Third paper on supply depot work.)

ANSWER TO (A).

The tests applicable to textile fabrics issued by a naval medical supply depot, include:

Identification of the weaving.

Determination of tensile strength.

Thread count.

Determination of weight.

Shrinkage test.

Identification of raw material employed.

Quantitative estimation of constituents of fabric.

Waterproof qualities.

Fastness of dye.

Special tests on surgical dressings.

In order to ascertain compliance with the depot's specifications, it is necessary to identify the woven character of the fabric. The medical supply depot handles a variety of differently woven fabrics such as twill, nainsook, huckaback, gauze, etc.

The tensile strength test, or breaking point test, is an important factor in determining the utility of fabrics intended for use in clothing or bedding, the tensile strength of a fabric constituting a reliable index to its wearing qualities. This test detects defects in manufacture which might otherwise pass unnoticed and will also establish if the bleaching of the fabric has been effected without material injury to the threads of same. Tensile strength is determined by exerting tension on prepared test pieces of standard size. The test pieces in most instances are prepared by cutting strips one inch wide and 10 inches long, 10 strips being cut in line with the filling and 10 pieces in line with the warp. The test pieces are then dried at 125 F. for one hour and cooled in a dessicator. (The object of drying at a designated temperature is for the purpose of testing under standard conditions. Fabrics when moist show higher tensile strength than when dry.) After being cooled, the test pieces are secured, one at a time, in the jaws of the testing machine with the jaws a definite distance apart (usually three inches) and pulled to rupture.

The tensile strength machine in use at the naval medical supply depot in Brooklyn consists of an upper clamp jaw which is connected to a dial indicator and ratchet counterweight and a lower clamp jaw which is independent of the upper one. A motor actuates gears which in turn cause the lower clamp jaw to travel downward at a uniform rate of speed. When a test piece of fabric connects the two clamp jaws the downward motion of the lower jaw is transmitted to the upper jaw and the tension thus exerted on the test piece is registered by the indicator dial which is prevented from receding by a ratchet arrangement attached to a counterweight. Obviously, when the test piece breaks the movement of the lower clamp jaw ceases to be transmitted to the upper clamp jaw and the indicator ceases to register. The dial of the machine is graduated in pounds up to 300 pounds, and the point at which the indicator stops is the breaking point or tensile strength of the fabric.

Textile fabrics are constructed of warp, or longitudinal threads, and filling, or traverse threads. The warp runs parallel to the selvaige while the filling runs at right angles to it. In samples lacking selvaige it is not always an easy matter, except for those experienced in textile work, to differentiate between the warp and the filling. The warp yarns are generally more tightly twisted than those in the filling and possess higher tensile strength. When a fabric is woven of wool yarns in one direction and cotton yarns in the other, the cotton threads constitute the warp.

Fabrics purchased for a naval medical supply depot are required by specifications to have a certain thread count, i. e., to contain a

specified number of threads in the warp and the filling within the area of one square inch. The number of threads in the weave determines the closeness of the texture of the fabric. A thread count markedly lower than that specified would be considered a falsification of the fabric.

The thread count is determined by the aid of a thread counter. The instrument in use at the naval medical supply depot in Brooklyn consists of a magnifying lens mounted on a lateral screw. A pointer is attached to the lens and the lens and pointer are caused to travel over a graduated scale by revolving the screw. As the pointer travels, each thread it passes is counted until the pointer has traveled one inch on the scale.

The weight of a fabric is specified in terms of weight per yard. Generally a piece 12 inches square is employed and the weight found calculated to a yard. Before weighing, the fabric is dried in an air oven at 150 F. for an hour. This is termed "conditioning" the fabric. The material and weight specified, together with the thread count, enable bidders to identify the fabric desired and will determine the size yarn of which the fabric will be constructed.

As shrinkage affects the utility of garments, the supply depot requires pajamas and other garments purchased for the medical department to be constructed of "preshrunk" material. The extent of shrinkage can be determined by taking accurate measurements of the garment, pouring hot water over same and allowing it to remain immersed overnight, after which the garment is dried at a moderate temperature, smoothed out, and again measured. Appreciable shrinkage would constitute a cause for rejection.

The identification of raw materials constituting a fabric may be effected microscopically or by chemical means. For microscopic examination yarns from the filling and warp are dissected into fine fibers, placed in a glass slide, and examined under low power. Reference to illustrations contained in textbooks will enable the examiner to determine the identity of the material. Wool is examined microscopically for shoddy. If the sample shows a number of yarns of various colors and the yarns exhibit frayed, brush-like ends, shoddy is present. In reworking shoddy the threads are always torn, hence the brushlike appearance presented by the ends of shoddy yarn.

Wool is readily identified by the characteristic odor of burnt horn which is evolved when wool is ignited, and by its solubility in caustic alkali. Cotton is insoluble in caustic alkali, and may therefore be demonstrated in a cotton and wool mixture by boiling same for two hours in 7 per cent potassium hydroxide solution, when the wool will dissolve, leaving the cotton behind. In a fabric containing a mixture of cotton and linen the cotton threads may be demonstrated

by immersing the sample in a 1 per cent alcoholic solution of fuchsin, washing with water until the color ceases to run and steeping in ammonia water for a few minutes. The cotton threads will not retain the dye, whereas the linen threads will be dyed rose color.

The quantitative estimation of constituents of fabrics purchased at a supply depot is limited to wool, cotton, and linen, and mixtures of cotton with wool, and cotton with linen. The following quantitative analytical methods are adapted from "Technical Testing of Yarns and Textile Fabrics," by Herzfeld:

MIXED FABRICS OF WOOL AND COTTON.

Estimation of moisture.—Five grams of the material are placed in a tared weighing bottle and dried in an air oven at 100 C. to constant weight. The loss in weight indicates the moisture present.

Estimation of cotton and wool.—About 5 grams of the material, cut in small pieces, are placed in a tared Erlenmeyer flask and weighed on the analytical balance. The increase in weight over the tare of the flask is the weight employed. The material is boiled for 15 minutes with 100 mls of 0.1 per cent sodium hydroxide solution. The sodium hydroxide solution is decanted and the material is washed by decantation with hot water several times. The material is next treated with 100 mls 10 per cent potassium hydroxide and heated nearly to the boiling point for 15 minutes, the flask being shaken occasionally. The potash solution is decanted and the fabric washed with hot water by decantation. Enough 5 per cent hydrochloric acid is now added to cover the fabric and the flask is heated for 15 minutes on the water bath. The acid is decanted and the fabric is washed by decantation with hot water and boiled for 15 minutes with water. The water is decanted, the fabric is washed with alcohol, then ether, and finally dried to constant weight at 100 C., cooled in a desiccator and weighed. The residue in the flask is cotton. If no dressing or dye is present in the fabric the weight of the cotton is deducted from the weight employed originally, and thus the amount of wool is found by difference.

When the fabric contains dye and dressing, the cotton is estimated as above and the wool may be estimated by the following method:

Five grams of the material are placed in a flask and boiled with 100 mls 0.1 per cent sodium hydroxide solution for 15 minutes, then washed well by decantation with hot water, then covered with 75 per cent sulphuric acid for two hours, after which it is washed with water. The material is next boiled for 15 minutes with water, washed successively with alcohol and ether and dried at 100 C. to constant weight. The residue in the flask is wool.

Estimation of linen.—Linen in a mixed fabric containing linen and cotton may be estimated as follows:

Five grams of the material are boiled in dilute hydrochloric acid, thoroughly rinsed with hot distilled water, then steeped in concentrated sulphuric acid for one and one-half or two minutes. The fabric is washed thoroughly with water, rubbed between the fingers, then neutralized by immersion in dilute sodium carbonate solution. It is again washed in water, then dried to constant weight. The dipping in sulphuric acid does not affect the linen threads while the cotton threads will undergo distintegration and dissolve.

When microscopic examination reveals that the filling consists, for instance, entirely of linen and the warp is of pure cotton, then the quantity of linen and cotton present in the fabric can be determined without resort to chemical means. A perfectly square piece is cut from the fabric and dissected, the filling threads and the warp threads being separated. The warp and filling threads are then weighed separately. By dividing the weight of the filling $\times 100$ by the sum of the weights of the filling and warp we would obtain the percentage of linen present and by the same principle the percentage of cotton. This method gives quite accurate results and saves time.

Waterproof fabrics are employed for the manufacture of hospital corps pouches, various cases, and impervious dressings. The supply depot specifications require the fabrics to contain a certain percentage of paraffin and, as well, accurately describe the fabric desired. The fabric is extracted with ether in a Soxhlet's continuous extraction apparatus and the fabric is tested physically in the usual manner. The fabric is also tested to ascertain if it is waterproof. The test is carried out by forming a basin out of the material, securing the corners, and suspending the fabric basin to some convenient object so that the fabric hangs free. Water is then poured in the basin formed from the fabric and the underside of the fabric is examined 12 hours later for leaks.

The fastness of the dye employed is determined by washing the fabric in warm soap solution of standard strength. This test is practically limited to towels and Red Cross brassards, these articles being the only supply table items containing dye. In testing Red Cross brassards it is noted whether the color has been imparted to the soap solution and if it has run on the white portion of the brassard. When the washed brassard has dried its color is compared with an unwashed brassard. It might be noted in passing that there is no dye which will prove absolutely fast when exposed to the action of the various chemicals in laundries.

Special tests are applicable to gauze dressings. Gauze dressings should be sterile, soft, absorbent, free from filler and mechanical or

chemical irritants, hence the rigid specifications of the supply depot. The following tests are taken from the specifications of the naval medical supply depot in Brooklyn on gauze:

Water extracts.—The extract obtained by a hot distilled water extraction of the gauze shall weigh, when dried to a constant weight at 100 C., not more than 0.25 per cent of the weight of the gauze extracted; the weight of inorganic matter is not to exceed 30 per cent of the water extract. The aqueous extract shall be of neutral reaction and free from starch, dextrin, glue, or other loading material.

Alcohol extract.—The extract obtained by extracting the gauze during six hours with 95 per cent ethyl alcohol shall weigh, when dried to a constant weight at 100 C., not more than 0.55 per cent of the weight of the gauze extracted.

Ether extract.—The extract obtained by extracting the gauze during six hours with ethyl ether shall weigh, when dried to a constant weight at 100 C., not more than 0.55 per cent of the weight of the gauze extracted.

Ash.—The ash shall not exceed 0.06 per cent of the weight of gauze incinerated.

ANSWER TO (B).

The specifications prepared at the naval medical supply depot will be used to exemplify the requirements which should be part of specifications in order to obtain satisfactory hypodermic tablets. Tablets purchased under these specifications have been found to be uniformly accurate as to drug content, quickly soluble, and in all other particulars suitable for hypodermatic medication. That part of the specifications limiting the diameter of the tube describes the maximum size tube which will fit the old style hypodermic cases. When the new style case which will hold larger tubes is in general use throughout the service, that part of the specifications which limits the diameter to 0.24 inch will become inoperative.

Hypodermic tablets.

The finished tablets shall be smooth without chipped or over-turned edges or other defects indicative of poor workmanship. The diluent shall be none other than pure lactose; tablets shall be free from oil, boric acid, talc, or other materials except the diluent and the drug specified. All tablets shall be readily soluble, forming a clear solution free from insoluble foreign matter as determined by dissolving 20 tablets in 20 mls of distilled water at 40 C.

The variation in weight of the drug content shall not exceed 5 per cent, either above or below, from that declared on label.

Each 20 tablets to be contained in an amber-colored tube with lipped mouth; space above tablets shall be fitted with clean white cotton. Each tube shall be securely stoppered, and properly labeled with the name, weight, and number of contents; i. e., shall read as specified under item number. The words "Hypodermic Tablets,

POISON," in red letters and the manufacturer's name shall appear on the label. Each tube must not measure more than 0.24 inches in diameter, including label, and not more than $3\frac{1}{2}$ inches in length including cork (dimensions not to apply to tubes for quinine chlorhydrosulphate which may be larger). The tubes must be suitably packed in cardboard boxes containing 5 tubes each; each box shall bear a label as specified for tubes.

ANSWER TO (C).

In examining catgut it is necessary to note if the suture has been introduced in the tube without twist and with one free end projecting above the fracture mark to facilitate removal, as required by supply depot specifications, and if the storing fluid is ample to three-quarters cover the coil. The tube is then broken at the fracture mark. If the fracture mark is properly engraved there will be no splintering of glass, and a clean break will result. The strand of catgut is now examined to determine if it is uniformly twisted and smooth and possesses the requisite pliability. The length of the suture is determined and should be not less than the specified 57 inches. The diameter of the suture is ascertained with a micrometer gauge and should be 0.012 inch for No. 00 catgut with an increase of 0.003 inch successively for each larger size.

The tensile strength of the catgut is determined by securing a 22-inch length of catgut in the tensile-strength machine and pulling to rupture. The specified tensile strength of catgut runs from 3 pounds for No. 00 to 20 pounds for No. 4. The average of six tests is taken to indicate the strength of a lot submitted for test. While the catgut is undergoing tension in the machine it is observed to note whether it exhibits normal elasticity.

The storing fluid is examined to ascertain its identity and to determine if it is acceptable within the meaning of the specifications. An acceptable storing fluid should volatilize readily, without leaving an appreciable residue, should not harden the catgut nor cause it to deteriorate in strength, nor should the vapor, when the storing fluid is boiled in a sealed tube, cause the tube to burst. Very often samples of tubed catgut are submitted for test which burst during boiling.

The boilability of the catgut is then determined. Boiling the sealed tubes should not affect the tensile strength of the catgut. Accordingly six tubes are boiled in a sterilizer for two hours. The tubes are opened, the catgut is removed, allowed to dry at room temperature to volatilize the adherent storing fluid, and tested for tensile strength. The average tensile strength figure obtained is compared with the figure obtained by testing the unboiled catgut.

Catgut sutures should be tested bacteriologically for sterility.

Samples naturally represent the manufacturer's best efforts, and if a manufacturer can not submit a satisfactory sample in connection with a bid it would seem to be good evidence that he could not be relied upon to furnish satisfactory material in quantity. Hence the importance of requiring bidders to submit samples with their bids. By testing the samples submitted, inefficient and undesirable bidders are eliminated, wastage of material and labor is prevented, and the Government is saved the embarrassment and delay in deliveries incident to replacement of rejected material. By requiring samples in connection with bids the depot is also enabled to select the best of the materials offered in the market.

Samples should be submitted by bidders in connection with bids for the following classes of supplies:

Nonofficial drugs.

Surgical instruments and appliances.

Surgical dressings, etc.

Dispensary and laboratory equipment and miscellaneous.

Hospital and nursing appliances.

Bedding and linen.

Hospital stores.

Shipping caskets and embalming supplies.

Nonofficial drugs are not required to meet any legal standards, and hence nonofficial drugs found in the market vary considerably in quality. It is, therefore, necessary to have the bidders on such drugs submit samples for test before award of contract is made.

Surgical instruments and appliances and dental equipment for the Navy must be of the highest quality and workmanship, and the ability of the manufacturer to furnish proper instruments can be judged only by the sample instruments he can produce.

Surgical dressings, dispensary and laboratory equipment, hospital and nursing appliances, and bedding and linen are required by a supply depot in very large quantities and, as a rule, must be especially manufactured to meet the depot's needs. Contracts for materials in these classes sometimes amount to hundreds of thousands of dollars. Manifestly, it would be unjust to the manufacturer to expect him to take the risk of proceeding with manufacture of material on such a large scale without affording him the opportunity to submit a sample for the depot's approval. No matter how precisely specifications are worded, certain manufacturers will find some pretense for misinterpreting them. If the contract is awarded for material in accordance with specifications and to be equal to sample submitted with bid, no misunderstanding can result and at the same time the Government's interests are amply protected.

Hospital stores must be judged by their palatability and nutrient value and not by their cost. Hence, samples should be submitted with bids on items coming under this class and the samples examined and analyzed.

In no class of supplies does the sample constitute a better index to the manufacturer's ability than in the case of shipping caskets. Very few manufacturers have been able to meet the depot's stringent specifications for this item. If award of contract were made to a manufacturer on his reputation and quoted price alone, the depot would very likely be faced by a shortage of shipping caskets. The sample submitted by the bidder is tested to determine if it is gas-tight. Very few shipping caskets pass this test. In addition, caskets are tested for leaks under water at the place of manufacture.

Bidders are not required to submit samples in connection with official drugs, or tablets containing same, as official drugs not meeting the United States Pharmacopœa or National Formulary standards are not permitted to be sold in the United States. Official drugs are, however, analyzed when delivered. In the case of official drugs, if same are rejected for noncompliance with official standards, replacement can readily be effected by purchasing against the contractor's account in the open market.

The books listed in the supply table are standard works readily described by specifications, and hence samples are not required in connection with these items.

Stationery is generally obtained from the local supply officer and the sample question, therefore, has no bearing on this class of supplies.

ANSWER TO (E).

The essential requirements that should be incorporated in specifications in order to obtain an up-to-date operating table for general issue to the service are well exemplified in the specifications employed at the naval medical supply depot in Brooklyn, and are quoted herewith.

Tables, operating (complete with fittings).

"Tables to be of tubular steel, 1-inch standard iron pipe size, properly primed and covered with six separate coats of best quality white enamel, each coat to be separately baked on; spur wheels, worms and ratchet bars in adjusting mechanism to be constructed of milled-tool steel, finely finished, top of table to be "Monel" metal, table legs to be fitted with hardwood plug feet; table to be about 33 inches high, with top 72 inches long by 20 inches wide; table to be quickly adjustable to Trendelenburg, Hartley, Fowler, gall-bladder and kidney, and cystoscopic positions; fittings to be composition or bronze, nickel

plated, and to include heel stirrups, Bierhoff knee crutches, shoulder supports which shall be of the automatic self-locking type, etherizer's screen, and combined foot rest and perineal instrument tray; sockets for fittings of composition metal of clamp type to be fitted with adjustable white-enameled-ware instrument tray and holder, and adjustable white-enameled-ware basin (12 inches in diameter) and holder.

"All points on material, finish, and measurements not covered by the foregoing specifications to be like and equal to table which may be seen at the United States Naval Medical Supply Depot, Brooklyn, N. Y.

"All material and workmanship to be of the very best quality throughout.

"Alternate bids differing from above specifications will be considered providing full description with cuts or blue prints are furnished with bid."

P-6C.

127240(63).

CORRESPONDENCE COURSE FOR NAVAL PHARMACISTS.

(CIRCULAR LETTER.)

WASHINGTON, D. C., 20 June, 1919.

To: All pharmacists.

Subject: Correspondence course for naval pharmacists.

Reference: (a) Bureau of Medicine and Surgery letter 42022-M-22, of 8 December, 1919; Bureau of Navigation first indorsement.

1. The Bureau of Medicine and Surgery has altered the correspondence course for naval pharmacists, from the exchange of questions, answers, critiques, etc., to the issue of subject matter for information and study.

2. The training of a naval pharmacist should include a thorough knowledge of the clerical work carried on in the Bureau of Medicine and Surgery, and therefore, to this end, it is intended to issue instruction papers covering the activities of the various departments of the bureau as follows:

- (a) Hospital Corps personnel.
- (b) Records and pensions.
- (c) Statistical division.
- (d) Requisitions and public bills.

In addition to a full explanation of the more intricate forms used, with particular reference to just what is done with the form when received in the bureau, instructions will be given as to why certain information is required on forms, pointing out the common errors, and it is hoped by this method of instruction to reduce to a minimum the errors commonly occurring in reports and returns.

3. In collaboration with the instruction now being given at the Hospital Corps Training Schools the bureau intends to issue papers from time to time covering the general duties performed by pharmacists. These papers will be

prepared and mailed after completion of the above-mentioned papers on bureau work.

4. The bureau asks for your earnest cooperation and will endeavor to present the study material in such a manner as to make the course both interesting and profitable. Please acknowledge receipt of this letter and also submit in the same letter any comments, suggestions, and criticisms which you may have to offer. Address all correspondence to "Correspondence Course for Naval Pharmacists, Bureau of Medicine and Surgery, Navy Department, Washington, D. C."

W. C. BRAISTED,

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., September 1, 1919.

In conducting the correspondence course for naval pharmacists, in accordance with the Bureau of Medicine and Surgery letter No. P-6C, of June 20, 1919, an attempt will be made to lay particular emphasis on the clerical duties, commissary duties, Hospital Corps instruction, and other activities of the naval pharmacist, and on such pharmaceutical and chemical knowledge as may be of importance to the Hospital Corps.

In the preparation of papers Nos. 1 and 2, compiled by Lieutenant (T.) A. F. Bigelow, Medical Corps, United States Navy, acknowledgement is made to Lieutenants (T.) O. G. Ruge, C. E. Alexander, J. Holden, E. L. Sleeth, and L. C. Sims, Medical Corps, United States Navy, for their assistance in the collection of data concerning the work in their respective branches.

H. H. LANE,

Lieutenant Commander, Medical Corps, United States Navy.

PAPER No. 1.

N. M. S. 127240 (63).

CLERICAL WORK IN THE MEDICAL DEPARTMENT, UNITED STATES NAVY.

HOSPITAL CORPS DIVISION, BUREAU OF MEDICINE AND SURGERY.

The Hospital Corps Division of the Bureau of Medicine and Surgery is divided into two sections: Section 1 handles general correspondence, reports, and returns, details, promotions, and supervises the instruction of the Hospital Corps. Section 2 conducts the correspondence course for naval pharmacists and gathers material for the Hospital Corps Supplement and also reviews all examination papers for advancement to the ratings of first class and chief pharmacist's mates.

SECTION 1.

Hospital Corps Forms: N. M. S. H. C. 1; N. M. S. H. C. 2; N. M. S. H. C. 3; N. M. S. H. C. 4; N. M. S. H. C. 5; N. M. S. H. C. 6; and N. M. S. H. C. 6, revised, for chief pharmacist's examination.

N. M. S. H. C. 1.—Examination report, Hospital Corps, has recently been revised and now includes N. M. S. H. C. 5, special qualifications for chief pharmacist's mates and first-class pharmacist's mates, on the reverse side of the form. This form should be carefully completed in the case of every hospital corpsman who is enlisted or who is examined for a higher rating. If properly filled out on the first page and signed by the candidate's senior medical officer, it furnishes the board with a survey of the candidate's education, service since enlistment, conduct, special qualifications and the opinion of the medical officer under whom he is serving, as to the candidate's general ability. The report, in all cases of promotion, should be made in duplicate, one copy to be forwarded to the commanding officer having custody of the man's service record and the other copy to the Bureau of Medicine and Surgery direct. When received in the bureau, the report is filed in the hospital corpsman's jacket after entries have been made on the proper card indexes and on the face of the jacket, showing his change of rating. As a permanent file, this report is invaluable in judging hospital corpsmen's ability and experience when considering future assignments to duty. This report is expected to render the old efficiency report, N. M. S. H. C. 2 obsolete, as the information contained on the examination report is more comprehensive and complete than that on the efficiency report.

N. M. S. H. C. 2.—This form is becoming relatively less important as the new examination reports are received and it will probably be abolished or replaced by another form in the future. The efficiency report is filed in the man's jacket and is not used for checking purposes in the office.

N. M. S. H. C. 3: Hospital Corps Disposition Card.—This double card replaced the post card formerly used for reporting changes in the Hospital Corps. It is of the utmost importance that this form be filled out and forwarded immediately to the Bureau of Medicine and Surgery in every case of transfer of a hospital corpsman, in accordance with instructions printed on the back of the card. This form is used in the bureau for (a) checking location of the hospital corpsmen in the service; (b) entering on the jacket the hospital corpsman's station and date of transfer; (c) as an index file showing the location of all hospital corpsmen in the Navy. It can readily be seen that failure to forward these cards promptly may result in inefficiency and lack of information in the detail office and often works an injustice to the hospital corpsman by the inability of

the detail office to properly credit him with sea duty actually performed. For example: John Jones, HA-1, is transferred from the naval hospital, New York, to a battleship; if his card is not sent in he is carried on the bureau records as being on duty at the naval hospital. Possibly months later, it is found he is carried on the roster of a ship. Sometimes the date of his transfer is not available and he is given a transfer date from the time he is picked up. This is recorded on his jacket, and as a result Jones is credited with less sea duty than he has actually performed. Transfer cards should be forwarded upon transfer of pharmacists and all hospital corpsmen for any cause, by death, discharge, medical survey, transfer to a hospital, sick, or by transfer to or from ship or station.

N. M. S. H. C. 4: Roster report, Hospital Corps.—This is also an important form and great care should be exercised to insure its accurate preparation. The revised form greatly lessens the work of naval hospitals, as the names of hospital corpsmen are now required once a month, instead of weekly as formerly. It is urged that the column for authorized complement, men on board, and percentage of hospital corpsmen to complement, be filled in. When received in the bureau, the form is used for checking the correctness of the disposition cards, in the preparation of complement reports and in correcting a colored pin chart of all hospital corpsmen on duty at naval stations, naval hospitals, hospital corps schools and on foreign duty. Roster reports are filed for future reference until a new report is received, when the old one is destroyed.

N. M. S. H. C. 5: Special qualifications, chief pharmacist's mates and first-class pharmacist's mates.—This form is now printed on the reverse side of the examination report, N. M. S. H. C. 1, and should be made out in all cases of candidates for the rating of first-class pharmacist's mate and chief pharmacist's mate, acting and permanent.

Miscellaneous reports and returns used in the Hospital Corps Division.—Jackets for all hospital corpsmen. When an examination report or enlistment chart is received in the bureau showing the enlistment of a man in the Hospital Corps or change of rate to the Hospital Corps, a jacket is immediately made out and placed in the alphabetical file. This jacket shows surname, middle, and Christian name, date and place of enlistment, rating in which enlisted, and spaces are provided on the front for changes in rating and remarks. The balance of the jacket is ruled to record changes of station. Thus the outside of the jacket shows the various ratings held by the man since his entry into the service, his stations, and dates of transfer. All correspondence, of whatever nature, is filed in the man's jacket. Jackets are removed from live files and placed in the dead files upon discharge for any cause. It might also be noted here that the corre-

spendence contained in any of the jackets furnishes the bureau with a ready reference of the hospital corpsman's character and ability, as well as the manner of performing his duty.

Card indexes are used for many purposes in the office, a few of which are: A card index by station of all pharmacists and chief pharmacists on a visible revolving index file; disposition cards are used for this purpose; a card index of change in rate to chief pharmacist's mate and first-class pharmacist's mate; card index of special qualifications of hospital corpsmen, divided into special lines of work such as anesthesia, X-ray, sanitary duties, pharmacy, chiropody, stenography, bacteriology, etc., and under the appropriate heading the name of each hospital corpsman, known to be especially proficient in that particular branch, is catalogued. Card indexes of enlistments and discharges, date of enlistment and date of expiration of enlistment for all hospital corpsmen are kept in this office.

A wall chart is used which is divided into squares; each square contains colored pins representing a certain number of men in the various ratings, and these pins are shifted on the board as changes occur on the roster reports of the various stations.

Correspondence.—Much of the correspondence carried on in the personnel office is unnecessary and could be eliminated if hospital corpsmen understood the limits of authority held by the Bureau of Medicine and Surgery. This bureau has no authority to discharge or transfer any member of the Hospital Corps, but can only make recommendation to the Bureau of Navigation for action. Recommendations made by the Bureau of Medicine and Surgery pertaining to personnel must be made in accordance with the policies governing the personnel of the Navy as contained in Navy Regulations, Naval Instructions, and the various letters and circulars issued by the Bureau of Navigation. It can be readily understood that favorable action can only be taken when such requests come through official channels and conform to the policies of the Navy Department. In making requests, a concise statement of the reasons for the request forwarded through official channels has a much better chance for favorable action than indirect correspondence sent through unofficial channels.

Files.—A system of filing based on the subject file described in Pharmacist's Correspondence Course, question 7, is in use. All correspondence pertaining to individual hospital corpsmen is filed in the man's jacket. Another file, alphabetically arranged, is used for filing correspondence from and to individuals not in the Hospital Corps, which pertains only to the individual concerned. The general correspondence file is divided into the following subjects, which are again appropriately divided into subheads: General policies;

legislation; summaries, etc.; duties of hospital corpsmen; promotion; change of rate; examinations, etc.; pharmacists; transfers (requests for men and place to which transferred); instruction and training; publications; medical and dental students.

SECTION 2.

Hospital Corps Supplement.—The Supplement to the U. S. Naval Medical Bulletin is published for the information of the Hospital Corps of the Navy. This Supplement is prepared from material received from the service at large and various other sources. Material is collected, arranged and edited. Photographs and drawings are collected which illustrate subjects pertaining to the work of, or of interest to, the Hospital Corps of the Navy.

The Supplement is prepared for press by the officer in charge of the Division of Publications and then sent to the Government Printing Office, with a requisition for the required number of copies; the past four issues have been from 12,000 to 15,000 copies each. It is the desire of the Bureau of Medicine and Surgery to make the Hospital Corps Supplement a medium of communication between the bureau and the Hospital Corps by publishing information pertaining to the work of the corps which may be useful in carrying on its many duties and by encouraging the expression of ideas and views held by members of the corps, who are invited to submit articles for publication.

Those desiring to submit articles for possible publication should read the note "Preparation of Manuscripts for Press," which is printed in each issue of the Supplement, before forwarding their manuscript.

Correspondence course for naval pharmacists.—The bureau has altered the correspondence course from an exchange of questions, answers, critiques, etc., to issue of subject matter for information and study, and circular letters outlining the new course will shortly be issued.

HOSPITAL CORPS PROMOTION. HA-2; HA-1; PHM-3; PHM-2; PHM-1; CPHM.

The training of a hospital corpsman is divided into four periods:

- (a) Hospital Corps school.
- (b) Naval hospitals (dispensary, sick quarters, training stations, office medical aids, supply depot, navy yard).
- (c) Ships. (Marine detachments, overseas, etc.)
- (d) Advanced school.

During the first enlistment this training is usually divided as follows: Hospital Corps school, 6 months; hospitals, 6 months to one year; ships, 18 months to two years. The remainder of enlistment under (b), (c), or (d).

Hospital apprentice, second class; examination requirements.—Subjects:

- (a) Aptitude (general service record).
- (b) General education: Arithmetic, spelling, writing (legible and grammatical), geography, United States history. Hospital training and knowledge of nursing is advantageous.

Forms required to be submitted to Bureau of Medicine and Surgery: N. M. S. H. C. 1, properly marked. Average mark of at least 3 is required. (See Manual Medical Department, par. 525.)

Hospital apprentice, first class; examination requirements.—Subjects: As above, (a) and (b); also—

- (c) Anatomy and physiology: Skeleton, joints, muscles, digestive apparatus; blood and circulatory system; respiratory and excretory apparatus; other organs.

- (d) Minor surgery and first aid: Surgical and operating room technique; emergencies, contusions, wounds, hemorrhage, sprains, dislocations, fractures; conduct of surgical technique; preparation for operation, both as to supplies and appliances of patient and operator; minor surgery procedures; operating room attendant; sterilization; removal of foreign bodies in eyes, ears, air passages; treatment of effect of excessive heat and cold; bites of poisonous animals; insensibility; fits; asphyxia or suffocation; bandaging; application of splints; knowledge of Hospital Corps drill.

Forms required to be submitted to Bureau of Medicine and Surgery: N. M. S. H. C. 1, properly marked. Average mark of at least 3 is required.

NOTE.—Hospital apprentices, second class, are usually rated hospital apprentices, first class, upon graduation from Hospital Corps schools.

Pharmacist's mate, third class; examination requirements.—Subjects: As above, (a), (b), (c), and (d); also—

- (e) Nursing and materia medica, practical and theoretical, including ward management, beds and bed making; baths; treatment other than by mouth; external applications; temperature, pulse, respiration, symptoms, clinical records; names and uses of instruments and appliances; medical and surgical nursing; preparation of patient for operation. Therapeutic classification of drugs of the United States Pharmacopœia, common botanical and official names, parts used; doses, active principles, toxic doses, poisonous symptoms, antidotes.

- (f) Elementary hygiene and sanitation: General and field. Water; air, ventilation; heating and lighting of wards; disposal of waste; disinfection and disinfectants; sterilization, handling of infectious diseases and prevention of disease. Practical duty in the field.

Forms required to be submitted to Bureau of Medicine and Surgery: N. M. S. H. C. 1, properly marked. Average mark of at least 3 is required.

Pharmacist's mate, second class; examination requirements.—Subjects: As above, (a), (b), (c), (d), (e), and (f); also—

(g) Diets and messing for the sick: classes of food; various articles of diet; diet for special diseases; obtaining and preparation of food; proper service of diets to patients.

(h) Clerical procedures and forms: knowledge and preparation of bureau forms; typewriting and ability to formulate tables and charts.

(i) Pharmacy and chemistry: pharmaceutical processes employed in the manufacture of official preparations; relative proportion of the more important drugs entering into their composition; weights and measures; specific gravity, etc.; incompatibilities; chemical symbols; the formulae of the more important chemicals, with tests for identity and the reactions produced by their combination.

Forms required to be submitted to Bureau of Medicine and Surgery: N. M. S. H. C. 1, properly marked. Average mark of at least 3 is required.

When qualified in accordance with the above outline, candidates for the rating of hospital apprentice, first and second classes, and pharmacist's mates, third and second classes, may be so advanced without further reference to the Bureau of Medicine and Surgery. (Except for the forwarding of N. M. S. H. C. 1.)

Since the beginning of the war, commanding officers have been authorized to advance enlisted men in ratings under such instructions as have been issued from time to time.

The requirements laid down in Bureau of Navigation's Circular Letter 139-18 under "Note," paragraphs 6, 7, 8, and 9, are now authoritative.

6. Enlisted men of the Regular Navy and enrolled men and women of the Naval Reserve, may be advanced in rating, a grade at a time, after they have proved their qualifications, upon examination, in accordance with General Order No. 63, subject to the following conditions: Advancement in rating up to petty officer third class is restricted to persons who have served not less than one month in the next lower rating. From petty officer third class to petty officer second class, two months' service as third class is required. From petty officer second class to petty officer first class, three months' service as second class; and from petty officer first class to chief petty officer, six months' as first class.

7. Exceptions to the above schedule of advancement in ratings will be made only upon special authority of the Bureau of Navigation.

8. These restrictions do not apply to advancement in rating upon completion of training at trade schools; but such men shall be advanced in rating in accordance with previous instructions.

9. The above instructions for advancement in rating will not apply to men on foreign stations or on ships not attached to naval districts, and commanding officers will be governed by previous instructions regarding advancement of rating.

Pharmacist's mate, first class; examination requirements.—Subjects: As above, (a), (b), (c), (d), (e), (f), (g), (h), and (i); also—

(j) Sick bay and ward duties; care of property and records; routine and provision for performing and accomplishing the various duties in the care of the patient and the ward itself; detail of hospital corpsmen; care of storerooms; care of dispensary; proper stowage and safeguarding property; systematic methods in keeping track of and safeguarding records.

(k) Practical work in all subjects.

Forms required to be submitted to Bureau of Medicine and Surgery:

N. M. S. H. C. 1, properly marked.

N. M. S. H. C. 5, properly made out and signed.

Candidate's written questions and answers.

A specimen of, and a statement as to proficiency in typewriting.

Navy Navigation Form 21, Transcript of Service Record. (See Manual paragraph 488.)

Average mark of at least 3 is required.

Chief pharmacist's mate (acting); examination requirements.—Subjects: As above, (a), (b), (c), (d), (e), (f), (g), (h), (i), (j), and (k), except more advanced than for first-class pharmacist's mate.

Forms required to be submitted to Bureau of Medicine and Surgery:

N. M. S. H. C. 1, properly marked.

N. M. S. H. C. 5, properly made out and signed.

Candidate's written questions and answers.

A specimen of, and a statement as to proficiency in typewriting.

Navy Navigation Form 21, Transcript of Service Record.

Average mark of at least 3 is required.

Chief pharmacist's mate (permanent); examination requirements.—Subjects: As above (a), (b), (c), (d), (e), (f), (g), (h), (i), (j), and (k), except more advanced than for chief pharmacist's mate, acting.

Average mark of at least 3.5 is required.

The requirement of six months' sea service for acting chief pharmacist's mate before he is eligible for a permanent appointment. (Bureau of Navigation Circular Letter 199-18.)

The regulations governing examinations are Navy Regulations, 113 (1); 3551 (7); 3317 (2); Bureau of Navigation's Circular Letter No. 87-18 of 17 May, 1918; Bureau of Medicine and Surgery Circular Letter No. 42022-H-33; General Order No. 63, in addition to those regulations and instructions previously quoted.

The Bureau of Medicine and Surgery considers that a hospital corpsman should be recommended for advancement in rating only

when through experience as well as by study and practical demonstrations, he has shown himself to be competent to successfully hold the rating next above the one in which he is serving at the time of examination. Six months is considered none too long a time for the average man to gain the variety of experience and knowledge necessary for him to qualify for advancement in a Hospital Corps rating; it is especially desired that hospital corpsmen be advanced no more rapidly than one rating at a time.

Before advancement to any higher rating a hospital corpsman must have served satisfactorily in all respects in his present rating, must have received during this period an average mark of not less than 3 in proficiency in rating and obedience, and 4 in sobriety, and have a record clear of infractions of discipline for the past year. No person shall be advanced in rating who is in the second conduct class. (Naval Instructions 3668 (10).)

Examinations are conducted before a board of three medical officers, or two medical officers and a pharmacist, at least one of whom has had two years' service in the Navy. Usually these boards are detailed from a station or ship other than that upon which the candidate is serving.

Hospital corpsmen desiring to be promoted at a recruiting station should request transfer, at their own expense, to the nearest naval hospital for the purpose of examination, or request transfer from recruiting duty. (Bureau of Navigation Annual Circular, paragraph 5.)

Permanent appointments of chief petty officers may be revoked at the discretion of commanding officers. (Bureau of Navigation's Circular Letter 107-18.)

In addition to the above subjects which hospital corpsmen are examined in, there are certain subjects covered in General Order No. 63, which every man on board ship, of whatever rating, will be instructed in and will be required to prove his knowledge of:

A. Necessity of realizing the twofold nature of duty in the Navy, namely, the military duties, irrespective of rating, and the particular duties of the rating in which men enlist or which they may attain.

B. What the Navy offers.

C. Enlistments in general.

D. Pay tables.

E. Naval customs.

F. General characteristics of ships of the Navy.

G. General features of ships of the Navy—classes.

H. Routine in port and at sea.

I. Aim and object of all general drills.

J. Marking clothes.

K. Personal cleanliness.

L. Painting, preparation of surface, etc.

M. Swimming.

N. Athletics.

All chief petty officers, *irrespective of rating*, must have a thorough knowledge of the following special subjects required for all chief petty officers:

- (a) Responsibility of chief petty officers.
- (b) Duties in general.
- (c) Privileges.
- (d) Pride in the performance of their duties.
- (e) Chances for advancement.
- (f) Duties at emergency drills.
- (g) Uniform regulations.
- (h) Drill book.
- (i) Duties of beachmaster, patrol officers, etc.
- (j) Making guard trips.
- (k) Routine division duties.
- (l) In general, the duties of junior division officers.
- (m) The ideas and ideals of an officer.
- (n) Methods by which a chief petty officer can obtain exact knowledge.

All examination papers sent to the Bureau of Medicine and Surgery are carefully examined by an officer in the Hospital Corps office, and in cases where all required papers are not received, when the candidate's papers fail to show that he is qualified for the rate or where the examination has not been conducted in accordance with instructions contained in the Bureau of Navigation's Annual Circular, a letter is sent to the candidate's commanding officer informing him of the irregularities and, if considered advisable, the Bureau of Medicine and Surgery recommends to the Bureau of Navigation the revocation of the rating issued.

Examination for warrant officer, Hospital Corps, pharmacist:

Pharmacist.—A man eligible to be examined for the warrant grade of pharmacist should, in addition to his eligibility as determined by the Navy Department, be, first, a well-trained, experienced, capable, and dependable chief pharmacist's mate who has a thorough and complete knowledge of the clerical duties of the Medical Department, and of the management of sick bays and hospital wards.

The Bureau of Medicine and Surgery desires that only chief pharmacists' mates having marked and exceptional aptitude for the Hospital Corps, and a degree of executive ability, initiative, tact, and experience above the average be recommended for examination.

The naval pharmacist should have knowledge and experience as well as capability sufficient to enable him to take the leading position in the Hospital Corps of the Navy at any of the naval establishments.

Qualifications and examination requirements.—A candidate for appointment as pharmacist must be serving under acting or permanent appointment as a chief pharmacist's mate, have served at least three years in the Navy as an enlisted man, at least two years of which service must have been performed on board a cruising vessel, prefer-

ence being given to men who have been honorably discharged, and whose service has been continuous. The average of his marks taken from all his service records must be not less than 85 per cent. No person shall be appointed a pharmacist unless his accumulated previous service in the Army, Navy, and Marine Corps, together with his possible future service prior to attaining the age of 64 years, will amount to at least 30 years.

Preliminary application and preliminary examination.—The request to appear for examination, the preliminary physical examination, the preliminary professional examination with commanding officers' indorsement is all covered by the Bureau of Navigation Form No. 334, "Application blank for warrant examination."

All applicants must be examined by a preliminary board of officers, to determine their physical and professional fitness. A report of insobriety or unexcused absence over or without leave shall disqualify any man from appearing for warrant examination for at least two years after date of offense.

The preliminary examination is conducted with a view to ascertaining whether or not the candidate possesses the necessary qualifications to become a thorough and practical warrant officer; this includes a knowledge of the subjects enumerated under Appendix J, of the Bureau of Navigation's Circular Letter No. 121-18 of 1 July, 1918.

Copy of applicant's current service record, and expressions of opinion from present commanding, executive, or senior medical officer, as the case may be, must accompany the application blank.

Letters of former officers under whom a candidate has served are unnecessary. (General Order No. 234.)

The final mental, moral, and professional examination of candidates for appointment as pharmacists in the Navy is conducted by two boards, one (supervisory), to consist of three medical officers, or, when practicable, two medical officers and a pharmacist, appointed on the station upon which the candidate may be serving; another (the statutory board), to convene at Washington, D. C. The local board assigns a mark for practical work and the oral examination and, also, conducts the written examination, but does not assign a mark for this.

Questions are asked on the following subjects:

- Pharmacy.
- Chemistry.
- Hygiene and sanitation.
- Clerical procedure.
- Administration.
- Commissary supervision.
- Minor surgery and first aid.
- Anatomy and physiology.

Questions are prepared by the Naval Examining Board for Pharmacists at the Naval Medical School, Washington, D. C.

Forms required to be submitted to president, Naval Examining Board of Pharmacists:

Questions and answers.

Proceedings of local examining board.

Copy of precept.

Copy of order to local board to convene.

Candidate's statement as to his physical qualifications, and any other special forms which might be necessary.

The oral and practical examinations, unless otherwise directed, are marked by the supervisory board; also, this board assigns a mark for officelike qualities of the candidate.

The Naval Examining Board at Washington, D. C., marks the written examination, enlistment records, and other records which may be on file.

DIVISION OF PHYSICAL REQUIREMENTS, BUREAU OF MEDICINE AND SURGERY.

Medical Records, Health Records, Pensions, Insurance.

This division is divided into three working sections—

First section.—Boards of Inquest; courts of inquiry; line of duty and misconduct; physical examination and promotion of officers; review of findings of medical examining boards; surveys of officers; gratuity, Supplies and Accounts; miscellaneous.

Second section.—Surveys of personnel, other than officers; reports of death, review of; rejection reports, action on; Nurse Corps, physical requirements; action on. Federal board data, taken from medical surveys.

Inasmuch as the above sections affect policies not of much concern to the pharmacists, they will not be explained in detail, but a working knowledge of them will be given for information purposes.

Boards of inquest are held to ascertain by an examination of the body the cause of death. In every case the board shall, after investigation, state in the record their identification of the body and whether and to what extent, in their opinion, the death of the individual was due to disease contracted or casualties or injuries received, while in the line of his duty. If the board expresses the opinion that death was not in the line of duty, they will, in addition to such opinion, state whether or not the deceased met his death as the result of his own misconduct.

These records are reviewed in the Bureau of Medicine and Surgery to determine whether or not the inquest has been conducted in accordance with the existing regulations and instructions from a physical standpoint.

Boards of inquest are ordered in all cases of death occurring in the Navy as the result of an accident, or attended with unnatural or suspicious circumstances. Such boards are composed of not less than three commissioned officers, of whom one at least shall be of the Medical Corps.

Courts of inquiry are ordered whenever an accident occurs involving loss of life of any person or persons on board a vessel of the Navy, or at any naval establishment within the jurisdiction of the Navy Department, or whenever such accident occurs elsewhere and it is possible that any person in the naval service, is, in any degree, responsible therefor, to investigate fully and report upon the circumstances connected therewith and to give an opinion in regard thereto. It shall be stated in the record whether or not the death of any person in the naval service was due to disease contracted, or casualties or injuries received while in the line of his duty and not the result of his own misconduct. The records are referred to the Bureau of Medicine and Surgery in order that the findings of the board, together with the approval or disapproval of the Secretary of the Navy determining the "line of duty status" of the individual in connection with the causative agent, may be placed on file with the Record and Pension Division.

Line of duty and misconduct status.—In the case of an officer or enlisted man of the Navy or Marine Corps in active service absent from duty on account of sickness or disease resulting from his own intemperate use of drugs or alcoholic liquors or other misconduct, regulations require the medical officer to make entry in the health record (on report of death and medical survey), stating specifically whether such disease or injury was received in the line of duty or not in the line of duty, and when not in the line of duty, whether it was due to his own misconduct. When the commanding officer and the medical officer are in accord, the entry shall be final. Should they disagree, the commanding officer will call a board of officers of not less than two members, one of whom shall be a medical officer, to report upon and make recommendations in the case. The approval by the commanding officer of the findings of this board shall be final; but if the commanding officer disapproves the findings of the board, the proceedings will be forwarded for the action of the next higher authority.

All such papers are filed in individual jackets for future reference.

This "line of duty and misconduct status" is very important and should always be placed as an entry in the health records upon admission and readmission to the sick list, in order to prevent future complications.

Physical examination for promotion; officer personnel; review of findings of medical examining boards.—When an officer is due for promotion or selected for promotion, his medical history is written up from date of last promotion from records on file in the bureau. It is sent to the Bureau of Navigation and incorporated with other papers being sent to the Naval Examining Board.

Survey of officers.—When an officer is surveyed by a medical board and found incapacitated for further duty on account of disease or injury incurred in the line of duty, he is ordered by the Secretary of the Navy before a naval or marine retiring board, as the case may be, and in this event the medical history is written up from the time he was commissioned or appointed, regardless of length of service, in order that the retiring board may have all the facts of the case. This information is furnished to the Bureau of Navigation who forwards it to the president of the retiring board. Medical history, if desired for a period prior to 1911, when the health record was issued, must be obtained by consulting case papers, medical journals, and Form F reports on file in the bureau.

If the board rejects an officer for physical reasons, such action must be referred to the department and the medical division of the department is the Bureau of Medicine and Surgery. These records are reviewed to determine whether or not a proper decision has been rendered and to either disapprove or approve the board findings; in case of disapproval, action is required such as to reconvene the board, or recommend disapproval of its action, grant a decision in favor of the officer in question, or make its own recommendations.

Surveys of officers differ from enlisted personnel in that no officer can be detailed except by approval, direct or indirect, of the Bureau of Navigation, which procedure involves issuing of orders and defraying certain expenses. For these reasons the Surgeon General signs all surveys referring to officers. Surveys are given critical review, particularly when the survey board recommends that an officer be ordered before a retiring board. The period of service for an officer is unlimited, while the period of service for an enlisted man is limited. The function of the department of medicine and surgery is to keep all personnel fit for retention in the service, and for this reason it is necessary to review and pass judgment upon all surveys.

Gratuity, supplies, and accounts.—This gratuity, covered by law, gives six months' pay to the next of kin or designated beneficiary of an officer or enlisted man immediately upon notification of the death from wounds or disease not the result of his own misconduct; but before this sum can be paid, in addition to reports made from the

field, the bureau is called upon to pass in its opinion whether or not the disability did or did not originate in the line of duty.

Miscellaneous.—All correspondence relative to matters above referred to and, in addition, requests for continuation of supernumeraries for treatment in naval hospitals and all civilians admitted for treatment are acted on by this section; also, letters of inquiry, telegrams from families, relatives, etc., as to condition of persons in naval service are answered by this section.

Surveys of personnel, other than officers.—These surveys are reviewed and recommendations made.

Reports of death are reviewed here and a copy filed in jacket for future reference after certain checking required by the statistical department. Duplicate copies of reports of death are required in order that one copy may be filed in the Bureau of Medicine and Surgery and one copy forwarded to the Bureau of the Census Department of the Interior.

Rejection reports are prepared by the recruiting officer and forwarded to the bureau, with recommendation that rejection be or not be waived. The Navy has certain standards of physical requirements, and some of these requirements that may cause rejection are in many instances not a disability; a man may have defects that disqualify him for the naval service, but that would not necessarily prevent him from following almost any pursuit in civil life. Degrees of latitude in physical qualifications are allowed up to a certain point; beyond this point the Bureau of Medicine and Surgery is called upon to make recommendations to the Bureau of Navigation or commandant of the Marine Corps, as the case may be, and the final action is determined by the Bureau of Navigation or the Marine Corps.

Nurse Corps physical requirements are handled in the same manner as rejection reports; this matter is dealt with directly by the superintendent of the Nurse Corps in the Bureau of Medicine and Surgery.

Data for Federal board.—When a man is to be discharged from the service for a disability, recent legislation authorized the Government to assume a certain responsibility for that individual if his disability was incurred in the line of duty and affects his earning capacity more than 10 per cent. These cases are referred to the Federal Board, Bureau of War Risk Insurance, and after discharge the person so affected may take advantage of rehabilitation, either by learning new pursuits or overcoming by training his present disability, in order to enable him to take up again his civil position

held at time of entry into the service. The Bureau of Medicine and Surgery is called upon to furnish to the Federal Board names and addresses of individuals so discharged, together with the length of service, cause of disability and, in terms of percentage, the amount of damage done in each particular case.

The third section of this division is divided as follows:

Third section.—Health records; personnel files; casualty reports and lists; pension certificates; war risk insurance certificates; examining and retiring board and promotion data; library of medical history books and journals of ships and stations.

When mail is received in this section, it is sorted and placed in alphabetical order; if referring to an individual, his jacket is taken from the files, the correspondence attached to the jacket, and the whole placed in baskets for the following divisions:

Physical requirements; Promotions and Pensions; Health records; Statistics; Casualties; Miscellaneous.

Health records.—In this section health records are filed, but before being filed they are reviewed to see that all necessary requirements are carried out. A health record primarily acts in the capacity of a service record except it treats of the physical condition instead of service condition. It contains name, date, and place of birth; date and place of enlistment, habits, traits, etc., in connection with civil life; then a descriptive list of constitutional makeup of the body, all variations from normal requirements of the Navy being noted; following this, on the medical history pages, all medical history or facts of physical condition from time of entry to discharge from service are recorded. This information is required by the Government because it assumes responsibilities for every person if disability, disease, or injury incurred during a term of service can be attributed to service conditions. Data taken from the health record are required by the Bureau of Pensions in settling claims; the Bureau of War Risk Insurance reviews the record to determine whether or not the Government will assume any financial care after the individual is out of the service, and it is therefore very important that all details be given in full. A "Note" in a health record carries the same weight as an "Admission" to the sick list with a retention for an indefinite period. Upon termination of service a physical examination should be made by the medical officer, and any defects not previously noted, whether incurred in line of duty or not, should be recorded in full.

The health record constitutes the medical history of persons in the naval service, and instructions for its preparation, keeping, and

closing should be carefully followed, as the history may also be used by the Department of the Interior in adjudication of pensions; by the same department in connection with the land claims; in Congress for their information in connection with private bills for relief of individuals when claiming disability in the service; by the Treasury Department in settlement of war risk insurance; allowing of compensation claims, and use of the Federal Board; also settlement and payment of auditor's claims in cases of death, desertion, and misconduct forfeitures. Medical history is furnished to all boards for promotion of officers and enlisted men; also used by casualty companies in settlement of claims for casualties and sickness; by beneficial and insurance companies and other large relief societies in settlement of claims for disease or disabilities.

In accordance with law, provisions of the Revised Statutes, and rules of the Navy Department, the health record of every individual in the service is held strictly confidential and may only be given to the man himself when personally applied for; to committees of Congress; heads of departments when required for official purposes; to beneficial and insurance companies in certain instances in connection with claims, and then only after satisfying the bureau that these claims are not to be used against the United States. This is why medical officers are not permitted to issue unofficial certificates of health (see Navy Reg., art. 2958) and also why all mortuary reports (life insurance) are prepared by the Bureau of Medicine and Surgery, the necessary data for the preparation of such records being based upon information contained in the reports of death on file in the bureau. Because of this ruling all life insurance death reports sent to hospitals, etc., from life insurance companies, and also those sent from relatives of deceased persons in the naval service, to be filed out by the attending naval physician, should always be referred to the Bureau of Medicine and Surgery for preparation and the writer informed that it is against laws and regulations for any person in the naval service to issue such certificates, except the Surgeon General, Bureau of Medicine and Surgery.

Personnel files.—In the Bureau of Medicine and Surgery every person in the naval service is given a jacket in which is filed during his period of service everything from letters seeking information relative to entry into the service, rejection reports, transfers for physical reasons, statements of rebuttal relative to "not in line of duty" entries in health records, letters of inquiry from relatives, copies of medical surveys, copies of death reports, to completed health records. Jackets are filed numerically and cross-index cards prepared and placed in the alphabetical cross-index file.

Casualty report, Form K-2.—This report is required in cases of unusual injury resulting in death or likely to result in death—in other words, an injury that jeopardizes life; for instance, if man falls and fractures skull and prognosis unfavorable, this requires the forwarding of a casualty report; man lost overboard requires the forwarding of a casualty report, etc. This form gives the medical officer an opportunity to report at once the disposition or prognosis of each case, which information is required in order to acquaint the various departments or relatives, friends, etc., with the desired information. Furthermore, it provides in the files of this bureau a chronological order of unusual casualty events in the Navy.

This report is not used in compiling statistics; simply for immediate information.

Pension certificates.—Pensions are, at the present time, issued for men in service prior to the present war who have been discharged from the service by reason of physical disability or otherwise, and feel that they have a claim against the Government for their disability. The Bureau of Pensions decides on amounts of all pensions awarded, Medicine and Surgery merely furnishing facts relating to the physical condition of the individual while in the service.

War risk insurance certificates.—Explained above.

Examining and retiring board and promotion data.—Explained above.

Library of medical history books and journals of ships and stations.—The bureau has in its files abstracts dating to 1820–1830, also journals that date back to the earliest history of our country and from the Mexican War to date, and continually being referred to in making up medical history, and in connection with organizations and societies in tracing lineal descendants; also for verification of facts whether members were or were not in the Navy, for entrance into certain societies; so the records are historical as well as medical.

The third section also cooperates with all departments of the Government in the formation of certain data accumulated by other departments relative to the census of the United States; also cooperates with the Department of Labor in furnishing information.

In connection with medical surveys one may wonder why such information as date and place of birth, date and place of enlistment, review of abstract in addition to diagnosis, origin, etc., is required.

Committees of Congress or heads of departments may call on the bureau for information regarding disabilities, particularly of those cases being discharged from the service. The length of service, home address, etc., is used in compiling certain statistics and in following

diseases which are indigenous to certain countries and localities. When reviewing surveys in the bureau, the date and place of birth and date and place of enlistment all have a bearing on the case, and it is not possible to review cases without this information, inasmuch as the survey is usually received in the bureau prior to the health record of the individual. The same is true of death reports.

Such data on surveys, death reports, etc., in addition to being used for a review of the case, are also of aid in establishing the identity of the person concerned.

In the preparation of medical surveys, there is one point on which opinions are sharply at variance, and that is paragraph 1265, Manual for the Medical Department, which states: "A person under treatment for a period of three months shall be surveyed in order that his further treatment or other disposition may be authorized, and in order that the bureau may have information as to the necessity for such prolonged treatment."

In many instances this order has been interpreted to survey only if carried 90 days under one diagnosis; that is, a patient might be carried under diagnosis of pneumonia for 76 days and on the seventy-sixth day have diagnosis changed to tuberculosis and be carried for an additional 75 days, 151 days in all, but would not have to be surveyed at the end of 90 days on account of only having 15 days under the new diagnosis.

This manner of calculation defeats the purpose of the order, and the bureau desires all cases under treatment for a period of 90 days, regardless of the number of times the diagnosis has been changed, to be surveyed for a continuation of treatment or other disposition.

The changing of medical department forms from time to time may be due to the bureau's desire to obtain certain pertinent history not being previously given in connection with personnel coming under its purview, and forms are also changed when unnecessary information, or information no longer required, is being received.

Congress enacts certain legislation or the department may require information in a different form or new data, and in order to comply with the laws and regulations it is necessary to change the forms accordingly.

It is never the bureau's intention to change a form, as it is appreciated that a change in a form causes confusion and interrupts routine; when a change is necessary, every effort is made to make its preparation as easy as possible and at the same time comply with all requirements.

A new health record is being prepared, simple in form, one record for all classes of personnel, and it will be easier to handle.

A new death report is being prepared on account of the fact that certain additional information is required.

A new dental Form K is being prepared and will be issued to the service in the near future.

NOTE.—When a new form is issued the bureau desires all copies of the old form destroyed immediately and all returns of that particular nature made only on the new form.

Based on the health record are all data necessary for the preparation of Forms F (cards), F, G, I, K, K-2, L, M, N, P, X, etc., handled from the service end, not the department end. After the Statistical Division is finished with Forms F, K, K-Dental, P, and X they are passed to the record section and kept on file.

STATISTICAL SECTION, DIVISION OF PREVENTIVE MEDICINE, BUREAU OF
MEDICINE AND SURGERY.

From the standpoint of preventive medicine the preparation and application of vital statistics in the Navy do not vary essentially from civil practice.

Figures relating to morbidity and mortality must be collected, compiled, and converted into rates in order that one may determine the incidence, distribution, and severity of disease, and in order that comparison may be made with similar figures for past periods and other communities.

The majority of persons have an aversion to any subject which involves arithmetic and too frequently those possessed of a liking for mathematics who happen to delve into vital statistics are prone to tautology and a complexity of expression. Thus the subject of vital statistics is often presented in a cumbersome way which makes it appear difficult, whereas in fact merely the ability to add, subtract, multiply, and divide is required for a practical working knowledge of statistical methods.

Vital statistics constitute an indispensable branch of preventive medicine and in general include the statistics of disease, deaths, births, marriages, and population. The vital statistics of the Navy are based on morbidity reports, mortality reports, and complement figures for the service as a whole, as well as for individual ships and stations. Morbidity reports reach the Bureau of Medicine and Surgery in the shape of Form F cards, telegraphic reports, and routine special written reports. The Form F card is an individual morbidity report analogous to the morbidity report which in civil practice must be forwarded to the health officer by the practicing physician for every case of notifiable disease occurring in his practice. In the Navy *all* diseases and injuries which require admission to the sick list are

notifiable. Death certificates (Form N), Form F cards, and Form I serve as mortality reports from which mortality statistics are derived.

On board ship or at a naval station compilation is ordinarily a simple matter of counting up the total number of admissions to the sick list or the number of admissions on account of certain diseases, number of deaths, number of sick days, or other data, depending upon the nature of the information desired. Where thousands of reports must be handled, as in the bureau, adding machines and machines especially designed for the purpose are used in compiling statistics. Figures thus compiled may be presented and studied in the form of tables or by graphic methods.

Without accurate and complete returns of deaths and diseases accurate statistics can not be compiled. Morbidity returns are incomplete when mild cases of a disease are not reported, and reports are incomplete when any of the data required on the form are omitted. Both errors and omissions vitiate vital statistics.

The Statistical Section is divided into two subsections.

Pharmacists are particularly interested in the handling of Forms F and K, etc.

The first section is the editing section and the second is the tabulating section.

Editing section.—Editing and checking reports as received; correspondence; permanent and reference files.

Tabulating section.—Punching machines transfer data from F cards to code cards; tabulating machines sort and tabulate code cards automatically; files for code cards by calendar years.

Form F card, original and duplicate.—This card shall be prepared in duplicate for every case taken up for record. The data for its preparation shall be obtained from the health record. The original shall be forwarded immediately to the Bureau of Medicine and Surgery, Navy Department, when the case is discharged to duty or otherwise disposed of, and the duplicate retained for office files and the preparation of smooth Form F. Only completed cards for cases disposed of shall be forwarded, except for cases continued to the next calendar year. On December 31 cards for all cases remaining on the sick list shall be forwarded to the bureau and new cards prepared for cases continued to the next year.

Instructions covering the preparation of the Form F card are: Instructions for numbered lines on the reverse side of the duplicate card; paragraph 3936 (d), Manual for the Medical Department, and Bureau of Medicine and Surgery Circular Letters Nos. 127465-2, of June 25, 1917, and 127465-3, of February 18, 1918.

When a Form F card is received in the bureau it is given a code number. Each ship and station has a number to identify that par-

ticular vessel or place and the number is placed on all F cards coming into the bureau, by hand, from an index. Key numbers are used to indicate vessels, stations, yards, expeditions, hospital ships, and hospitals, the units under each group being indicated by serial numbers. Example:

A Form F card received from the United States steamship *Henley* would be numbered 10021, the ten thousand being the key number for vessels and twenty-one the serial number for United States steamship *Henley*.

A Form F card received from the naval hospital, Brooklyn, would be numbered 50021, fifty thousand being the key number for hospitals, twenty-one the serial number for the Brooklyn hospital; or

If a card were given the number 40006, forty thousand would indicate a hospital ship and six the serial number to indicate the United States steamship *Mercy*, etc.

The cards are then sent to the tabulating section and the data recorded on the cards are, by aid of the punching machines, transferred on a code card in the code system. Example of a code card follows:

188105°—19—10

NAVY DEPARTMENT, BUREAU OF MEDICINE AND SURGERY.

Op. No.	Year.	12 Mo. 11	Day.	Place.	Occupation.	Age.	Race.	Class.	Diagnosis.	Part.	Char-acter.	Key.	Speci-alty.	Causa-tive Agt.	Complication Sequela, etc.	Taken Up.	Dis-position.	Ori-gin.	Days.	
0	0	10	00	000000	00000	00	00	00	00000	0000	0	00	0	0000	0	00000	0	0	0	0000
1	1	1	11	111111	11111	11	11	11	11111	1111	1	11	1	1111	1	11111	1	1	1	1111
2	2	2	22	222222	22222	22	22	22	22222	2222	2	22	2	2222	2	22222	2	2	2	2222
3	3	3	33	333333	33333	33	33	33	33333	3333	3	33	3	3333	3	33333	3	3	3	3333
4	4	4	44	444444	44444	44	44	44	44444	4444	4	44	4	4444	4	44444	4	4	4	4444
5	5	5	55	555555	55555	55	55	55	55555	5555	5	55	5	5555	5	55555	5	5	5	5555
6	6	6	66	666666	66666	66	66	66	66666	6666	6	66	6	6666	6	66666	6	6	6	6666
7	7	7	77	777777	77777	77	77	77	77777	7777	7	777	7	7777	7	77777	7	7	7	7777
8	8	8	88	888888	88888	88	88	88	88888	8888	8	88	8	8888	8	88888	8	8	8	8888
9	9	9	99	999999	99999	99	99	99	99999	9999	9	999	9	9999	9	99999	9	9	9	9999
1	2	3	45	678910	11121314	1516	1718	1920	21222324	252627	28	2930	31	323334	35	36373839	40	41	42	434445

Op. No.: Operator's number.

Year

Month

Day

} For recording date of admission.

Place: As above noted.

Occupation: This takes care of the ratings. Example: Officers are given the key number 100; subdividing this, 101 punched on the card would signify a line officer, 105 a chaplain, 109 a warrant officer, etc.; 600 would be the key number for artificers; subdivided, 610 plumbers and fitters, 614 shipwright; in other words, all the ranks and rates of the Navy are grouped according to occupation, a key number assigned to each group and serial numbers used to indicate a particular rating under each group.

Age: The year only in which born is indicated.

Race: United States (white), United States (colored), Filipino, etc.

Class: United States Navy classification.

Diagnosis: The Navy diagnosis number is used to record this data on the code cards.

For injuries: The part affected is coded by the use of key numbers and serial numbers. For example: The key number 100 would indicate the head, 200 would indicate the spine, while 106 would indicate the ear, and 202 the thoracic region of the spine, etc.

The key letters, specialty letters, and class numbers are likewise coded.

Causative agents for wounds are also coded.

Complication sequela, etc.: This column is used to tabulate information concerning change of diagnosis, etc., from the reverse side of Form F card.

Taken up: Taken up as "A," "RA," or "Continued" are punched—1 for admission, 2 for readmissions, and 3 continued.

Disposition and origin are coded and sick days punched.

After the information on the F cards has been transcribed to the code card, the F cards are returned to the editing section, where they are arranged alphabetically by ships, stations, etc., by the calendar months in which disposition occurs, until they are checked against the monthly Forms F and K. The bureau must have a Form F card for each entry that appears on the monthly Form F. After final check is made, Form F cards are transferred to a permanent file, arranged alphabetically by name of individual and diagnosis. They are retained in the bureau for a period of four years for reference file, and then destroyed, for by that time the health record will be in the bureau.

COMMON ERRORS IN FORM F CARD.

Line 1.—Surname and Christian names in full. Grade or rate (see Nomenclature). Frequently initials are used instead of Christian names in full and many errors are made in recording the surname. Frequently, the rank or rate is not clearly indicated by the abbreviation used; the rank or rate is essential for occupational tables, and only authorized abbreviations should be used.

Line 2.—For enlisted men only; leave blank for officers.

NOTE.—Information on this line is not tabulated for statistical purposes; it is used for identification purposes only.

Line 3.—Under place, give State, or country, if foreign born. Frequently the date of birth is not properly recorded, and in many instances entirely omitted. This is essential for age tables. *Incorrect date of birth is the most common error on Form F cards.*

Line 4.—When received as a patient from some other place, otherwise leave blank. No entry should appear on this line unless the case is a readmission and so recorded.

Line 5.—Only terms found in the nomenclature shall be used. Frequently other titles are used with failure to state location or the part involved for injuries, or it is not clearly indicated. When the part injured is entered as scaphoid, phalanges, etc., it should always be qualified by stating whether the scaphoid involved is carpal or tarsal, and hand or foot for phalanges, and the causative agent must be indicated. For poisons, name the substance and state whether acute or chronic. In cases of readmission care should be exercised to see that the case is taken up with the same diagnosis under which it was transferred.

Line 6.—Number refers to that found in the nomenclature preceding name of disability. Key letters shall be given for all wounds and poisons and specialty letters as required. The diagnosis number is frequently omitted and in many cases does not coincide with the diagnosis title entered on line 5. Navy class numbers or international numbers must not be entered on Form F cards. Key and specialty letters are very frequently omitted, especially for diagnosis undetermined (injury).

Line 7.—Use letters called for in the health record and indicate remaining from last year by a dash, followed by the date taken up in the previous year. Indicate origin by D., ND., or ?. The origin of the disability in cases taken up as "No disease" shall be determined in the same manner as prescribed in paragraph 2254, Manual for the Medical Department, for cases of bona fide disability. Under "Taken up as," care should be exercised to use abbreviations as indicated in the health record and particular care should be given to those admitted and those readmitted. Morbidity rates are based on admissions only, although all sick days for readmitted and remaining cases are checked as damage to the service; for instance, a case readmitted with tonsillitis, acute follicular is not charged against the statistics as a new case, although the sick days are entered. For cases "Remaining from last year," the date of admission on the new card should be the same as that on the previous card.

Line 8.—Use letters called for in the health record and indicate "continued to next year" by a dash; record number of sick days for current calendar year only. In every change of diagnosis, the necessary entries should be made on the reverse side of the card and particular care should be taken to indicate cases continued to next year.

Use only abbreviations indicated. Under no circumstances can a case of "Diagnosis undetermined" be disposed of as "To duty," "Died," "Invalided from the service," or to "Sick leave." Care should be exercised to enter the proper number of sick days, bearing in mind that the date of discharge and not the day of admission is a sick day. In continued and remaining cases, the number of sick days reported on the card should be those of the calendar year only. Bureau statistics are closed on December 31 of each calendar year, and the sick days for any one calendar year involve only the days from January 1 to December 31, inclusive.

Line 9.—No entry on this line unless the case is transferred as a patient.

Line 10.—This entry should clearly indicate the ship or station submitting the report (may be stamped in quantities before sending into Record Office), and should never be omitted, as it would be impossible to identify the record.

For regulations covering "Change of diagnosis," "Discharge to admit," "Discharge to readmit," etc., see instructions outlined in the health record and bureau circular No. 127465-3.

Form F, monthly abstract of patients.—This form is prepared and forwarded to the Bureau of Medicine and Surgery accompanied by Form K, for a whole or fraction of each month when a hospital, ship, or station is placed out of commission. The data for its preparation shall be obtained from the duplicate Form F card, kept for the purpose.

This report shall include all officers and men of the Navy and Marine Corps and those of the native and insular forces on the active list.

For the duration of the war all classes of reserves (NAS, NR, CG, LHS) shall be recorded in all respects as personnel of the United States Navy.

Personnel of the Navy and Marine Corps when carried as passengers and admitted to the sick list should be recorded in all respects as ship's complement.

Supernumeraries to be reported on Form F are: Retired officers and men, whether performing active duty or not, Nurse Corps (female), officers and men of foreign countries, United States Army personnel and civilians.

Supernumeraries are listed alphabetically and separately on Form F and should not be included in "Summary of disabilities," Form K. These cases do not enter into naval vital statistics.

Regulations covering the preparation of this form are: Instructions printed on the form; Bureau of Medicine and Surgery letter No. 125802 of November 27, 1917, and No. 125485 of August 5, 1915.

NOTE.—The main points mentioned in all circular letters quoted in this article will be given under “common errors.”

When the “Abstract of patients” is received in the bureau, it is checked against the Form F cards previously submitted. Each entry on the Form F must have a corresponding Form F card. Discrepancies are adjusted before the record is passed to permanent file. This form is filed under jacket file, alphabetically by ship or station, until the current calendar year is complete, then bound and becomes a permanent record of the Record and Pension Division of the bureau.

Common errors.—Names must be entered in strict alphabetical order with Christian and surname in full. Only authorized abbreviations for rating should be used. Under “Diagnosis” enter titles from the nomenclature, and, in addition to the diagnosis, enter key letters for injuries and poisons. Care should be taken with reference to sick days entered on this form, particularly from naval hospitals, as this information is used as a basis for reimbursement by the Bureau of Supplies and Accounts for rations issued in naval hospitals.

Form K, statistical report.—Regulations and instructions for the preparation of this form are given on the form itself and also in the letters mentioned under Form F, monthly.

When received in the bureau, particular attention is given to remaining and continued cases and cases reported as DD and IS. Form F cards for DD and IS cases are cross checked against tentative cards prepared in the bureau from death reports of medical surveys in each individual case, and Form K is not passed to file until all cases of DD and IS are accounted for. In making the separate lists and totals for diseases and injuries, care should be exercised to see that all cards bearing the diagnosis “Diagnosis undetermined,” if the diagnosis was established as an injury, are returned under “Injuries.”

The summary of the cruise should always be entered for ships, excepting receiving ships, whether in reserve, with Naval Militia or not, and the fact of being in one port for a whole quarter does not change this requirement. Expeditions or detachments of any nature should use this page on Form K to report their movements, giving dates of arrival and departure from any vessel or place (town and country) in which they may be operating.

The entries under “Personnel” (Hospital Corps) are essential for the information of the detail officer, with reference to changes in personnel.

This form is bound and filed with Form F.

Recruiting duty.—Persons on detached duty, and at other places from which regular quarterly returns, F and K, are not required, shall, when cases of illness or injury are brought to their attention, prepare and forward rough Form F cards.

Form K-Dental.—Forwarded in accordance with instructions covering Forms F and K. This form has just been revised and the new form will be issued to the service in the near future.

Disposition.—Checked and filed in current files until end of calendar year, when the data are tabulated and incorporated in "Report of dental operations," Surgeon General's Annual Report to the Secretary of the Navy. Forms are then arranged alphabetically by ship and station, are bound, and become a permanent record of the Record and Pension Division of the bureau.

Form P, report of surgical operations, calendar year.—Regulations covering this form are: Paragraph 3946, Manual for the Medical Department. When received in the bureau it is filed under current file until all reports are in for calendar year, when it is checked and the data tabulated, by operations, results, anesthesia employed, etc., for incorporation in "Table of Operations," Surgeon General's Annual Report. After data are tabulated, the form is arranged alphabetically by ships and stations, bound, and transferred to the Record and Pension Division for permanent file.

Common errors.—Under column 2, Navy nomenclature should be used, not the name of operation.

Form X, recruiting statistics.—Regulations covering the preparation of this form are: Paragraph 3951, Manual for the Medical Department, and instructions printed on the form. The data for its preparation are taken from the Form X (rough), which is a small self-explanatory card, prepared for each applicant examined.

This form when received in the bureau is checked for errors and passed to current file. The data are tabulated at end of calendar year and are incorporated in the "Table of Recruiting Statistics," Surgeon General's Annual Report. *Only rejections for physical reasons are to be reported on this form.* Rejections for service requirements, e. g., alien, failure to complete examination, under and over age, illiteracy, etc., should not be reported on this form, inasmuch as they are not rejections by the medical officer but come within the purview of the officer in charge of the recruiting station.

Common errors.—Special attention should be given to recording causes of rejection under the classification on the face of the report; for instance, rejections under "All other causes" are frequently reported as follows:

Missing members, ankylosis of joint, depressed skull, hammer toe, etc. These conditions should be entered under "Deformities," while

alopecia areata, bromidrosis, eczema, etc., should be entered under "Skin diseases."

Form I, report of sick (weekly), naval hospitals and hospital ships.—Regulations governing the preparation of this form are fully outlined in a recent letter of the bureau, and inasmuch as the letter was mailed to naval hospitals and hospital ships it is copied here for the information of all pharmacists.

WASHINGTON, D. C., June 4, 1918.

To: Medical officer in command (all naval hospitals).

Subject: Change in the manner of preparing Form I—Weekly report of sick from hospitals.

Inclosure: (1).

1. The purpose of the change is to reduce the time and labor involved in preparing the report.

2. Hereafter there shall be recorded in Form I only the names and data of those patients who have been admitted during the week (A or RA) and those discharged during the week for any cause, including change of diagnosis (C, D, DD, T, R, IS).

3. To make the Form I serve its purpose in the bureau with the continued cases omitted it will be necessary to add certain details of information with the entry of a patient's name after a change in diagnosis, or discharge for any cause, as described below. In the case of a change in diagnosis the former diagnosis or former diagnoses shall be entered in parentheses in column 3 under the diagnosis for which the new admission is made. In column 4 the name of the hospital (e. g. Hosp. Norfolk) shall be entered opposite the new diagnosis, and the place from which the patient was received originally shall be entered opposite the old diagnosis. In cases where the diagnosis has been changed in hospital one or more times previously all diagnoses shall be given in column 3 in chronological order, beginning with the latest. Column 5 shall contain the date of admission opposite each diagnosis. All dates except the current one shall be inclosed in parentheses. Upon discharge from the hospital for any cause the patient's name shall always be entered again in column 1 and all diagnoses in chronological order shall be entered again in column 3. In column 8 there shall be entered the letter or letters indicating the kind of discharge.

4. The guiding rule in preparing the body of the report will be—

The name of a patient will appear in column 1 each time for every admission (A or RA) and each time for every discharge (C, D, DD, T, R, or IS).

5. In the case of discharge for change in diagnosis or other double transaction occurring the same day (C&A, D&A, A&D, RA&D, A&DD, RA&DD, A&T, RA&T, RA&R) the patient's name will be entered in column 1 but once for the double transaction, and C&A or the other letters, as the case may be, will be entered in column 8.

6. Each time the diagnosis is changed a notation shall be made after the new diagnosis (even though another line be required) of one of the following reasons for the change: Error, complication, sequela, intercurrent disease, or recurrent disease. The following abbreviations may be used: er, comp, seq, int, rec.

7. It should be noted that it will be possible hereafter to post the Form I from day to day since each transaction, an admission, a discharge, a change in diagnosis, may be entered the day it takes place provided the hospital office

WASHINGTON, D. C., March 18, 1918.

From: Bureau of Medicine and Surgery.

To: Medical officer in command, United States Naval Hospital.

Subject: Weekly report of sick (Form I).

1. The bureau notes that the summaries heading weekly reports of sick, Form I, from naval hospitals are not being prepared uniformly.

2. Hereafter, the first column of the summary—*Remaining last report, admitted during week, total, discharged during week and remaining*—should carry figures covering all patients listed in the returns from the hospital, whether they are patients in the hospital proper, in tents, or in other buildings on the reservation, patients under treatment in outside institutions, as well as patients on leave or sick at home.

3. The second column, *Hospital proper*, will show all patients occupying beds in the main hospital and in other buildings or tents on the hospital reservation. Beds vacant will be listed accurately.

4. The third column, *Other units*, will be considered as comprising beds in all other institutions, including civil hospitals with which arrangements have been made to care for naval patients, as well as barracks, hotels, etc., and convalescents at home. In cases where the number of vacant beds available can only be estimated, the letters, "EST" should accompany the figures.

5. The fourth and last, *Total accommodations*, should carry figures which show the totals of beds occupied by all patients listed in Form K, whether occupying beds on the hospital reservation or in other institutions. Beds vacant will be listed as accurately as possible.

When received in the bureau this form is sent to the Division of Preventive Medicine, where a summary of sick in hospitals is prepared; this summary gives number sick last report, number sick this report, admissions, discharges, hospital beds, officer patients; enlisted personnel patients and also a recapitulation of the personnel (H. C.) on duty; in other words, a ready reference table, showing in columns following the name of the hospital, the above-mentioned data for each week. Copies of this summary are sent to the Surgeon General, assistant chief of bureau, officers, and personnel detail offices.

The Division of Preventive Medicine posts its weekly charts of communicable diseases from the Form I's received; then all communicable diseases are compiled and the data used in the preparation of the bulletin issued monthly by this department. It is also used for information regarding individuals.

When the form is sent to the Statistical Section, it is used as a reference in cross-checking. A file of reports for the current month is kept, after which it is transferred to a jacket file by quarters, arranged alphabetically until the end of the calendar year and when of no further use as cross-reference, it is destroyed.

Common errors: Care should be exercised in the preparation of this report to note all changes of diagnoses, and all admissions and discharges. It is frequently noted that cases are admitted and dis-

charged from naval hospitals without any entries having been made on Form I.

This form furnishes a ready reference for verification of diagnoses and other data with regard to adjusting discrepancies in Form F cards. In many cases, it furnishes sufficient information to enable the bureau to prepare Form F cards, particularly in those cases which have been transferred to a naval hospital from ships or stations and the cards from the latter places are lost in transit to the bureau. Also used for furnishing current information to the Record and Pension Division, and as a reference for verification of names, ratings, dates of admission, and dates of discharge.

NOTE.—Forward this form direct to the Bureau of Medicine and Surgery and send signed copy to the commandant of the district.

All the above-mentioned forms are to be forwarded to the bureau regardless of whether or not entries have been made for the period covered by the report. This informs the bureau that the report has not been overlooked.

DIVISION OF FINANCE, SECTION OF MEDICAL SUPPLIES AND EQUIPMENT,
BUREAU OF MEDICINE AND SURGERY.

It is not considered advisable to write a lengthy paper on the manner of preparing requisitions and public bills, inasmuch as full instructions for their preparation are given in the following references:

Supply table, Medical Department, United States Navy, 1918.

Manual for the Medical Department, 1917, chapter 8, section 11; chapter 21; and chapter 24, section 3.

Naval Regulations, chapter 40, section 3.

Naval Instructions, chapter 38, section 2; chapter 39, section 3; and chapter 41.

Bulletin, Index to Specifications, issued by the Navy Department for naval stores and material; procurable from Supplies and Accounts; a quarterly bulletin.

Allowance of furniture for quarters of commandants, commissioned officers, and warrant officers at navy yards and stations; obtainable from the Bureau of Yards and Docks.

Instructions printed on the various forms, and in addition to the above, such circular letters as may be issued by the Bureau of Medicine and Surgery from time to time.

If the individual preparing requisitions at any naval establishment can have access to a copy of each of the above-mentioned instructions he can, with very little difficulty, prepare requisitions properly.

There are a few points to be kept in mind, however, not covered by these instructions and they will be mentioned.

The section of medical supplies and equipment of the bureau handles all the requisitions of the Medical Department; bureau forms (in excess of allowance); open purchase and ships' requisitions; also, the vouchers appertaining thereto, as well as all correspondence bearing thereon. Reports of surveys on property of the Medical Department and transfers and inventories of property are taken care of in this department.

Forms B. B-Dental, B-a, and 4.—When any of the above-mentioned requisitioned forms are received in the bureau they are, if approved, entered in the bureau requisition or record book, with notation as to date of approval, then forwarded to the respective supply depots to be filled. After the form follows the prescribed routine, and the stores are receipted for, the second copy of the requisition is returned to the bureau, given a voucher number, and filed like any other voucher or public bill, under name of ship or station, by fiscal year.

It is apparent that no supplies of any nature, with the exception of biologicals, can be issued from a supply depot on letter form; there must be some authority for their expenditure from the depot, and the depot, bureau, and station to which issued must have in their files a voucher, and the above forms become vouchers after the supplies are receipted for.

Open purchase requisition Form 1 and ships' requisition, Supplies and Accounts Form 44 (Afloat).—When this form of requisition is received in the bureau, it is approved, modified, or if unsatisfactory, returned to the maker for explanation, modification, or cancellation. If approved, it goes to the Bureau of Supplies and Accounts for necessary action, a carbon copy being retained for the files of the bureau, entry being made of the same in the bureau requisition or record book, by fiscal year in series of ship or station concerned.

When copies of public bill or bills are received, they are filed with the requisition after being given a voucher number and entered in the requisition book, under the entry of the requisition from which the public bill was prepared.

In April, 1918, number of the United States Naval Medical Bulletin Supplement, an article on medical department requisitions was prepared by this division of the Bureau of Medicine and Surgery and published. This article set forth the errors commonly occurring in requisitions. It is the intention to explain each requisition in detail as this information course for naval pharmacists is continued; however, the above-mentioned article with slight modification is given here for information and guidance.

“Failure on the part of those concerned to thoroughly familiarize themselves with instructions governing the preparation of requisitions for medical and dental supplies, as laid down in the ‘Manual

for the Medical Department, 1917,' 'United States Navy Regulations and Instructions,' and the 'Handy Book for the Hospital Corps, United States Navy' (pp. 317-325, inclusive), is a continual source of embarrassment to the Bureau of Medicine and Surgery, inasmuch as valuable time is taken up in correcting errors and with correspondence relating thereto.

"Among the errors of commission and omission occurring in requisitions submitted to the bureau for approval, may be cited the following:

"Duplication of serial numbers during the fiscal year.—The medical department of a ship or station should commence numbering all of its requisitions serially on July 1 and continue the numerical series until the end of the fiscal year (June 30), and no distinction should be made between requisitions prepared on Medicine and Surgery forms and those prepared on Supplies and Accounts forms. In order to avoid duplication of requisition numbers from vessels, the writer suggests that a book be kept showing the number of the requisition, form used (M & S 1; 4; B; B-a; S & A 44, etc.), date forwarded for approval, date of receipt of stores, and, in the case of supplies received from a supply depot, date of forwarding receipted 'first' to the supply depot concerned and the 'second' to the Bureau of Medicine and Surgery. In this connection attention is invited to the fact that when a requisition is disapproved or canceled in the bureau and returned to the maker via the Bureau of Supplies and Accounts, the ship or station copy of the requisition should be so marked and placed in the files, and the serial number borne by the canceled requisition not assigned to a subsequent requisition during that fiscal year. In order that the files of the vessel or station may be complete, all correspondence relating to a canceled requisition should be filed with it. (In re the above see par. 3375, Manual for the Medical Department, 1917; also par. 2, p. 2, Form B.)

"Form 4 requisitions for articles not regularly issued or listed on the supply table of the Medical Department.—Form 4 requisitions are being limited to such supplies as are regularly issued or listed on the supply table. Every article not carried in stock at the supply depot necessitates special purchase, which greatly increases the work not only of the supply depot but of the Bureau of Medicine and Surgery and the Bureau of Supplies and Accounts.

"Failure to enter requisition number, date, and the name of ship or station, where indicated on requisition form.—A very common error.

"Placing regular Form B, Form B-Dental, and additional articles on the same requisition (Form 4).—As separate and distinct books are kept at the supply depot for each of the above-mentioned classes, the additional amount of clerical work involved by a requisition

covering more than one class is obvious. (See art. 3933 (a), Manual for the Medical Department, 1917.)

"Alteration of Form B and Form B-Dental by erasure, addition, or interlineation.—(See pars. 3931 (1) (h) and 3931 (2) (c), Manual for the Medical Department, 1917; also Par. III, p. 2, Form B.)

*"Requisitions for articles listed on the supply table submitted on SandA Form 44, with the request that they be issued by the supply depot.—*Such requests should be submitted on M&S Forms B, B-Dental, or 4.

*"Failure to number items on Form 4 and open-purchase requisitions.—*Item numbers should be continuous throughout a requisition and not numbered separately by classes.

"Failure to insert number of different sizes of ligatures, bandages, bottles, capsules, gloves, etc., as required.

"Failure to number quadruplicate copies of requisition Form B, B-a, B-Dental, 4, e. g. 'Quadruplicate first,' 'Quadruplicate second,' etc.—(See pars. 3931 (1) (c) and 3933 (b), Manual for the Medical Department, 1917.)

*"Failure to state the voltage and character of current upon which electrical apparatus required for is to operate.—*A common error; these requisitions must of necessity be returned to make for the desired information.

"Open-purchase requisitions involving more than one appropriation.—(See art. 4654 (2) (b), Naval Instructions.)

"Open-purchase requisitions for proprietary articles not coming within the provisions of article 4654, paragraph 2 (f).

"Underestimation of cost of items on open-purchase requisitions later necessitating a request for increase in estimate and thereby causing a delay in the delivery of articles required.

"Failure to enter estimated cost of items on memorandum copies of open-purchase requisitions.—(See art. 4654 (2) (g), Naval Instructions.)

*"Entering estimated cost of items on the 'First' of open-purchase requisitions.—*This is, perhaps, the most common error made in the preparation of this form of requisition.

"Failure to state the object for which supplies required for on open-purchase requisition are needed or the authority for the submission of the requisition.—(See art. 4654 (2) (h), Naval Instructions.)

"Requisitions for typewriters for use of the medical department of vessels.—(See art. 4571 (4), Naval Instructions.)

"Failure to state the number of typewriters or computing machines on hand when submitting a requisition for the same for use ashore.—(See art. 4571, Naval Instructions.)

"Requisitions for supplies far in excess of allowance not accompanied by an explanatory letter.

"Failure to classify articles required for on Form 4 according to the supply table.—(See par. 3933 (g), Manual for the Medical Department, 1917.)

"Requisitions for finger-print outfits.—(See 'Note' bottom of p. 137, Manual for the Medical Department, 1917.)

"Requisitions for Stoke's splint stretchers, mattresses, pillows, etc., from vessels.—(See par. 8421, Manual for the Medical Department, 1917.)

"Requisition for identification-tag outfits.—These outfits are furnished by the Bureau of Navigation. (See General Order 294, dated May 12, 1917.)

"Requisitions for platform scales for use at recruiting stations.—Platform scales for use at recruiting stations are furnished by Bureau of Navigation and not by Bureau of Medicine and Surgery.

"Before submitting a requisition to the bureau for approval, a careful study should be made of the regulations governing the type of requisition concerned, for strict compliance with the regulations will greatly facilitate the delivery of supplies and reduce to a minimum the correspondence relating thereto.

"When an open-purchase requisition from a hospital or shore station is to be submitted, the local supply officer should be consulted to ascertain whether or not the articles to be required for may be obtained through the supply officer on existing Supplies and Accounts contracts.

"The standard stock catalogue issued by the Navy Department in loose-leaf form is designed to cover all supplies regularly carried in stock by the supply officer at various designated navy yards. This catalogue furnishes data relative to the cost per unit, weights, specifications, nomenclature, stock numbers, distributing yard, etc., and may be consulted at the office of the local supply officer.

"Standard specifications are laid down for the guidance of those concerned in requisitioning certain naval supplies. An 'Index of specifications for naval material' is published at intervals by the Bureau of Supplies and Accounts, referring by name, number, and date to the specifications as separately printed. Copies of standard specifications will be found on file at the office of the local supply officer. Specifications under annual and quarterly contracts are distributed by the Bureau of Supplies and Accounts prior to the first of each fiscal year as supplements to the bureau memorandum, covering provisions, coal, gasoline, lubricating oil, fuel oil, boiler gaskets, CO, gas, and tool steel. 'Requisitions for material for which standard specifications have been adopted shall adhere strictly to such speci-

cations. Should it be found necessary to modify standard specifications, reasons for such modifications shall be stated, and, except in urgent cases, the requisition and reasons for modification shall be submitted to the bureau concerned.' (N. I. 4659.)

"The following form should be used on requisitions in referring to 'Standard specifications': *Name of article* to be in strict accordance with specification (number) issued by the Navy Department (date).

"The latest issue of specifications must be referred to, as published in current index.

"Among the numerous articles used by the medical department at hospitals and shore stations that are covered by standard Supplies and Accounts specifications may be noted the following: Fire hose, hospital mattresses, mattress covers, pillows, pillow covers, portable fire extinguishers, linoleum, hospital tents, potato peelers, dish-washing machinery, laundry machinery, dough-mixing machinery, etc.

"When a requisition for furniture is to be submitted from a naval hospital or shore station the contract schedule of the Bureau of Yards and Docks should be consulted at the local public works office. (See p. 324, Handy Book for the Hospital Corps, United States Navy, 1917.)

"When articles are missing from a shipment of medical stores the matter should be taken up directly with the supply depot concerned and not through the bureau. However, before such a report is sent in a thorough search should be made through all packing, small packages, cartons, etc., included in the shipment, as often, in order to utilize every available inch of stowage space, the supply depot packers will place small articles in boxes, cartons, etc., containing hot-water bags, irrigators, tablet triturates, and similar items.

"While requisitions for typewriters to be used by the medical department and shore stations must be submitted to the Bureau of Medicine and Surgery on requisition Form 1, those for use of the medical department afloat are furnished directly by the Bureau of Supplies and Accounts, through the supply officer of the vessel concerned. Requisitions for typewriters and computing machines for use at shore stations must show the number in use and bear no other item. They should never be purchased in advance of the bureau's formal approval. (Art. 4571, Naval Instructions.)

"Sterilizers and incubators for vessels, if allowed, are furnished and installed by the Bureau of Construction and Repair.

"Modification or elimination in the bureau of certain items on a requisition may be due to any one of the following reasons:

"Unusual market conditions resulting in a shortage of the articles requested.

"Requests for supplies far in excess of allowance when the necessity therefor is not apparent to the bureau. A requisition of this character should always be accompanied by an explanatory letter.

"Requests for articles not regularly supplied the type of vessel, base, or station from which the requisition emanates. Such a request should be accompanied by a letter explaining the necessity therefor.

"In order to reduce the amount of work at the supply depots, which at this time is an important factor, the number of bottles, tins, jars, rolls, etc., required for may be reduced or increased to conform to the number of such articles contained in original boxes or packages."

TO PHARMACISTS.

In glancing over past issues of the Hospital Corps SUPPLEMENT note has been made of the large number of hospital corpsmen who have been given temporary commissions and warrants, presumably for their superior knowledge and training.

It is noted that a relatively small number of these leaders in the corps have contributed to the SUPPLEMENT since its establishment. Why not share some of the knowledge and results of your training with the other members of the Hospital Corps through the medium of the SUPPLEMENT? The SUPPLEMENT can not be conducted successfully unless all members of the corps who have knowledge worth passing along are willing to assist in making it a success. "Exchange a dollar with a fellow and you each have a dollar; exchange an idea and you each have two ideas." Multiply the above by the number of contributions to the SUPPLEMENT and you will find that many new ideas are disseminated in the course of a year where they will do a vast amount of good. (Editor.)

MEMORANDUM NOTICE TO ALL PHARMACISTS AND HOSPITAL CORPSMEN.

Pharmacists and hospital corpsmen should take great care in the preparation of the Hospital Corps Roster Report (N.M.S.H.C. 4) and Arrival and Transfer Card (N.M.S.H.C. 3). The Roster Report is used in the Bureau of Medicine and Surgery, Personnel Division, to check the hospital corpsmen on duty in the hospitals with those that the files at the Bureau of Medicine and Surgery indicate are on

duty at that particular institution. Naval hospitals which fail to forward transfer card in the case of transfer of hospital corpsmen force the bureau to carry in its files, as part of the staff of the hospital, those hospital corpsmen who have been transferred. If no Hospital Corps transfer card is forwarded, and this oftentimes works a hardship on the hospital in view of the fact that the Bureau of Medicine and Surgery's files indicate a larger personnel than is actually on duty.

Individual hospital corpsmen should make sure that an arrival and transfer card (N.M.S.H.C. 3) is forwarded to the bureau each time that they are transferred from one station to another for duty.

In the preparation of the arrival and transfer card, it is recommended that a note be made on the bottom of the arrival card (old form), as to the station from which received, and the amount of sea service credited to date.

A number of transfer cards are received in the bureau stating that a hospital corpsman arrived at "U. S. Naval Hospital," without giving the location of the hospital. The hospital corpsman should make sure that all entries are properly made on this form.

The Hospital Corps Roster Report should be made out in strictly alphabetical order and have the names of all hospital corpsmen, including temporary chief pharmacists and temporary pharmacists, those on sick list, men awaiting discharge, etc., with the actual duty being performed and the status in each case set forth under remarks. (Editor.)

PREPARATION OF MANUSCRIPTS FOR PRESS.

Manuscripts accepted and prepared for press are designated "Copy."

Copy must be on one side of the paper only.

Double spacing and margin are essential in copy in order to leave room for corrections or change and for adding directions to the printer.

Manuscript corrections should be made at the site of the error, whereas corrections of proof are indicated in the margin.

The sign "%" on the typewriter is for commercial correspondence. Every time the typist uses the sign to save himself time and labor he imposes on the editor the task of erasing it and writing in *per cent.*

Do *not* underline headings or captions as underlining is a direction to the printer to use *italics*. Leave ample space above and below all headings for the directions as to type, etc.

In most of our Government publications we follow precedent and established routine. Hence, it is well to look up the forms used in previous numbers or editions. Thus, after a title of a paper on the next line put "By," followed by *initials, name, title, and corps*.

The writer and *not* the editor should verify the correctness of the name and designation.

Do not fasten sheets of manuscript together by a fastener which can not be easily removed without tearing the paper.

Do not use the form of official correspondence by which two or three spaces are left between paragraphs. Parenthetical marks then have to be added by the person preparing the copy for press. Do not number paragraphs as a routine procedure, but only when this is indicated in the next.

Avoid the use of capitals. Insist on having a dictionary accessible at all times, and never write a word about whose spelling you are in doubt.

Look up a good many words about which you have no doubt, and you will get some new ideas about spelling.

The more inaccurate and careless the manuscript and the more numerous the necessary corrections, the greater the certainty of errors in the printed work, since a certain proportion usually escapes detection.

Do not use the word *corpsman* by itself. It means nothing. A man may be a member of Medical Corps, Hospital Corps, Marine Corps, or even of a duelling corps at a German university. Hospital corpsman, however, is definite and specific.

Do not write "thru" and "tho." The phonetic idea having never been fully formulated and made universally applicable has little to commend it in practice at present. "Thru" and "tho" are mere abbreviations and have no place in properly prepared copy.

CONTRIBUTIONS.

Save your copy of the SUPPLEMENT and use it for reference. All information contained in its pages may not be of immediate value but may be just what you need at a later time. Each number contains information not found in the "Handy Book."

The contributions desired are articles dealing with measures and methods of treating the sick and injured, teaching and training, special duties, suggestions for improvement in any line of Hospital Corps work; pictures illustrating Hospital Corps activities; the corps on detached duty, on foreign stations, at training schools, landing parties, transportation of sick and injured, surgical X-ray and laboratory procedure, tropical duties, war pictures illustrating the work of the Hospital Corps; in short, any pictures which will be of interest and instruction to the corps.

The editor has been gratified by the interest already taken by hospital corpsmen and others who have submitted articles and pictures for publication in the SUPPLEMENT. It is hoped that the interest will continue and that hospital corpsmen, doctors, nurses, dental officers will all remember that they can talk to one another in the pages of this publication in a way which will be of benefit to all.

Several contributions have been received which, because of limited space, could not be published in this number.

The SUPPLEMENT will publish only material that is of special interest and benefit to the Hospital Corps, the editor reserving the right to turn over to other Navy magazines or papers material which is of interest to the Navy at large, rather than to the Hospital Corps in particular. Owing to the uncertainty of mail transmission the editor does not assume responsibility for the return of pictures, articles, etc., contributed.

Endeavor will be made to answer through these columns any inquiries submitted by hospital corpsmen that are of general interest to the corps. Strictly personal inquiries will not be answered. Unsigned letters will not be considered.

Address all communications to:

EDITOR OF THE SUPPLEMENT,

Bureau of Medicine and Surgery,

Navy Department,

Washington, D. C.

13a

8833 8543 32
07/13/05 MAB 